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Productivity in Industrial Engineering

THE terms of reference of the last productivity team to visit the U.S.A. under the auspices of the Anglo-American Council on Productivity were to investigate the American approach to improvement of methods of manufacture and to continuous reduction in operating costs in industrial engineering. The team's report emphasises three important factors in this approach: the urgent competitiveness of the U.S.A. economy; cost-consciousness among all ranks in industry and commerce and the rapid marshalling of cost figures; and concerted application of modern managerial techniques by the industrial engineers. The opinion is expressed that, more than any other factor, competition provides the drive for the more frequent analysis of costs and the application of industrial engineering techniques in the United States, and the constant efforts

to achieve the utmost use of labour, materials, machines, and money. Furthermore, pre-planning plays a vital part in the engineering industry as a whole, as do predetermined motion-time systems; and although in this respect nothing novel was found, the opportunity of examining American management methods at first hand is of practical value. Although the report is concerned only with industrial engineering, many of the team's recommendations can be applied to the railways and to the industries in this country supplying railways at home and abroad. Planned production affects, for instance, railway machine shops, foundries, and so on in an equal measure, as production in these departments is based on the requirements of the boiler and engine erecting shops, or stores requirements, in compliance with the demands of the locomotive running department. Planning already plays an important part in locomotive repairs and this has been realised and acted upon for many years by railway workshops in this country. There are many points in the report worth careful study by those concerned. The team points out that in general, there is a greater willingness among the workers in America to accept new methods than is the case in this country, which is linked with the demand for a higher standard of living. The actual cost of mechanical handling is also important, and is considered in relation to layout, and the team recommends that this and packing should be considered as stages in production.

Re-Organisation

COMMENT is made under this title by "The Man on the Line" in the current issue of *British Railways Magazine*, on some of the proposals of the recent White Paper as they affect the railways. For nearly two months many railwaymen have been speculating on the proposals for railway re-organisation, and doubtless more particularly on that for setting up area boards. Until explanations are forthcoming, as they are bound to be in the next session of Parliament, nobody is likely to be much the wiser for reading such comment as can be made in the circumstances. "The Man on the Line" adheres fairly closely to the wording of the White Paper in outlining the responsibilities of the proposed area boards and of the Chief Regional Managers, and does not comment on these. He stresses, however, that a measure of decentralisation must be introduced within the existing Regions and that plans for this are being worked out; and he emphasises the importance of inter-Regional emulation. Finally, he points out the White Paper proposals must be approved by both Houses of Parliament, and that it is likely to be next year before any important changes are carried out.

Glasgow Electrification Plan

AMOVE to implement some of the proposals put forward for electrification of Glasgow suburban lines by the Inglis Report in 1951 was made by the Glasgow Passenger Transport Committee earlier this week. The Committee, under the chairmanship of Sir Ian Bolton, a Member of the British Transport Commission, proposed to set up a joint committee with the Glasgow Corporation, the full co-operation of which will be needed in any scheme, to discuss the problem on the basis of mutual responsibility. In an informal discussion it was suggested that the first lines to be electrified might be those running between Airdrie and Balloch, and also the Cathcart Circle. Both these lines appeared in the first stage of the Inglis report proposals and the Airdrie-Balloch line runs through already congested areas east and west of Glasgow and would tap the new Drumchapel housing scheme, where the Corporation transport is inadequate. The joint committee is to examine the scheme, estimated to cost over £5,000,000, but its recommendations will not be binding on either party. The lines are not expected to operate at a profit, but the Glasgow transport problem is so pressing that a loss in these circumstances apparently is acceptable.

Machine Tool Orders

A GRATIFYING increase in British machine tool orders in the first two quarters of this year is shown by figures made available last week. New export orders in June alone almost equalled those of the second quarter of last year. The total value of export orders for the second quarter of this year was £5,300,000, compared with the total of £4,100,000 for the fourth quarter of 1953, the best for that year. The home market has shown a similar rise; orders have increased in value from £10,500,000 in the fourth quarter of last year to £10,900,000 and £12,400,000 in the first and second quarters of this year respectively. Although in spite of the increased flow of orders the machine tool industry's total order book at the end of June was lower than at any time for some years, this is explained by the speed with which manufacturers are now executing orders, and betokens a consequent shortening of delivery dates and increasing ability of firms to handle fresh orders.

Modernising a Mexican Railway

THE Pacific Railroad of Mexico is to receive a loan of \$61,000,000 from the International Bank to buy new diesel locomotives, wagons and rails as part of a four-year development programme. The Pacific Railroad, a standard-gauge system, was formerly the Southern Pacific Railway Company of Mexico, a subsidiary of the Southern Pacific of the U.S.A. It was sold to the Mexican Government in 1951 and a new company, in which that Government has a large share holding, was formed with the present title in 1952. The main line runs from the Southern Pacific at Nogales, Arizona, close to the Mexican border, to Guadalajara, the second city of Mexico, a distance of about 1,200 miles, following the west coast of Mexico for much of the way. It was not completed throughout until 1927. The material which is now to be acquired includes 33 all-purpose and 31 light diesel locomotives, 684 wagons, and 170,000 tons of rails. The new stock will enable the railway to handle more easily its much-increased freight traffic.

Meeting Higher Costs in East Africa

THE annual capital and renewal costs of the East African Railways & Harbours will rise from about £1,600,000 to £5,800,000 in the ten years 1949-58. To meet the economic expansion of the East African territories, the Administration has to buy new locomotives and rolling stock and pay for the construction of new deep-water berths and other large-scale works in a much dearer market than that of even a few years ago. The East African Railways & Harbours development programme, which will now cost £60,000,000, could have been undertaken for less than half that sum at that time. Mr. A. F. Kirby, General Manager, E.A.R. & H., explains the situation to the staff in an editorial note in the *East African Railways & Harbours Magazine* and appeals to all members to go "all out" to attract, by efficient and courteous service, the additional passengers and goods that will earn the extra £4,200,000 in overhead costs. The aim, he says, must be to continue to give still better service with the new equipment to justify higher wages and salaries, but without the imposition of further general increases in charges.

The Hedjaz Railway

THE unused section of the Hedjaz Railway between Maan and Medina in Saudi Arabia may be reopened. Representations of Saudi Arabia, Syria, and Jordan are examining means of carrying out the work. The Hedjaz Railway was begun in 1901 as a 105-cm. (3-ft. 5½-in.) line from Damascus to Mecca. The Turks intended it not only to facilitate pilgrim traffic to Medina and Mecca, but also as an instrument in their Pan-Islamic policy. By August, 1914, the line had reached Medina, and the final section to Mecca was never completed. The success of Lawrence of Arabia's efforts to cripple the Maan-Medina line are well known. Since the 1914-18 war this section has remained derelict, as Lawrence and his Arab train wreckers left it.

North of Maan the Hedjaz Railway continued to function after the break-up of the Turkish Empire and is worked by the railways of the successor States. At the meeting early this year between the Kings of Jordan and Saudi Arabia it was agreed to co-operate with Syria on the question of restoring the Maan-Medina section. A more remote possibility is the connection of this railway with an extension of the standard-gauge Saudi Government Railway from Riyadh to Jeddah, on the Red Sea.

Modern Bridge Design and Fieldwork in Thailand

IN general collaboration with the Chief Civil Engineer of the Thailand State Railways, British engineers were responsible for the design and supervision of some remarkable fieldwork in reconstructing three important bridges partly demolished during the last war. To avoid high and long approach embankments for the new bridges, they were built on the old centre lines, involving extensive demolition and at least one interesting reconstruction of a pier. This is described in a paper recently presented to the Institution of Civil Engineers by Messrs. Kerensky and Hyatt and summarised on another page. Advance in design technique is clearly demonstrated; the major result is that one of the new superstructures carries 50 per cent greater live load although the weight of steelwork is 600 tons lower than in the old bridge. Another new superstructure weighing only 6½ per cent more than its predecessor is designed for double the live load of the latter. These results were obtained by specifying extensive use of high-tensile steel, increasing the permissible stresses by 65 per cent, rearranging the trusses on much simpler and more economic lines, and by quasi-standardisation of spans, panels, and members, thus reducing the numbers of different steel sections required. The method is described of attaching suspended spans to cantilever arms, also the rebuilding of twin legs of a pier, each within a 24-ft. dia. cylindrical R.C. cofferdam, cast in rings in suspension.

Pullman Possibilities

THE extension of Pullman car facilities which the British Transport Commission is considering after its purchase of the ordinary share capital of the Pullman Car Co. Ltd. raises the question of the train services most suitable for inclusion of individual cars or replacement by complete Pullman trains. Important factors are the limited number of existing cars and the cost of building new ones; the latter was a main cause of the decision to buy the Pullman Car Company shares, as there was no prospect of any major increase in the company's revenue to offset rising building costs. Of the Regions of British Railways which at present include no Pullman services, the London Midland seems the best field for extension, with its big population centres and residential traffic in the provinces. A complete Pullman train, similar to the present "Yorkshire Pullman" of the Eastern Region, might be introduced between Euston and Manchester. The existence until relatively recently of the "club trains" between Manchester and North Wales, Southport, Blackpool, and Windermere suggests that individual Pullman cars might be popular in business trains between these places, as also between Liverpool and Manchester and perhaps over the Pennines to the West Riding. Other Regions doubtless offer possibilities worth examining.

Running Back without Knowing It

FROM time to time cases occur of drivers not realising that their engine which was proceeding with difficulty on an up gradient in a tunnel has stopped and begun to travel backwards, and this may even pass unnoticed by anyone else on the train. It may in certain circumstances lead to serious results, as when the tunnel entrance follows immediately on a station yard or similar location, or there are catch points not far away. Such a case occurred on March 7, 1954, in the North Queensferry tunnel, on the approach to the Forth Bridge from Inverkeithing, which is on a 1 in 70 gradient. An express from Aberdeen, loaded

somewhat over the maximum for the type of engine, entered the tunnel under a 20 m.p.h. speed restriction imposed after relaying, just completed, and slipping began, always more likely to occur when rails are new. The engine came to a stop and commenced to run back but nobody realised the exact position until the guard found himself in the open again. It was too late to take effective action as there were catchpoints immediately outside the tunnel and derailment followed. A summary of Brigadier C. A. Langley's report appears in this issue. He finds no fault with the train crew but considers it desirable to review engine loadings on the section, in view of certain facts which came to his notice. Tunnel lights are required and the catchpoints and siding might be moved further away with advantage. Plans for both these improvements are now being drawn up.

The Care of Steam Locomotives

THE publication of the tenth edition of "Locomotive Management" marks the 26th year of the existence of this standard text book for all who drive, maintain, or study steam locomotives. The latest, revised edition is reviewed on another page of this issue. The slow but steady changes in British steam locomotive practice are reflected by the alterations embodied in this edition, which now includes many details and diagrams of British Railways standard locomotives. That the book is of universal application is shown by the inclusion of information on techniques which are of great importance on some systems overseas, but no longer applicable to British Railways, such as oil firing. Diesel and gas turbine locomotives find no place in this work, but it will continue to be of the utmost value on railways in many parts of the world, where, as in Britain, steam must remain the principal form of motive power for some time to come.

U.S.A. Share in Indian Order

UNITED STATES manufacturers are expected to receive a half-share of the order for 100 "W.G." locomotives and 5,000 wagons to be acquired by the Indian Railways through an allocation of the Foreign Operations Administration in Washington. As announced in an editorial note in our August 27 issue, a Japanese group has bid £81,470 for each of the locomotives, for which, it is stated, the North British Locomotive Co. Ltd. and the Vulcan Foundry Limited put forward the third and fourth lowest tenders respectively. Of 12 tenders for the locomotives received from seven countries the only one from the U.S.A. was submitted by the Baldwin-Lima-Hamilton Locomotive Works. Although this firm quoted the high price of \$178,200 per locomotive, Mr. Harold Stassen, Director of the Foreign Operations Administration, has said that the high percentage of unemployment in the American railway building industry has controlled his decision to split the awards, giving half the contracts to United States builders and half to builders in other countries.

It seems probable that the locomotive contract will be divided equally between the United States and Japan, but that for the wagons may be shared on a wider basis, probably between the United States on the one hand and Japan and European countries on the other. It is understood that the lowest price for wagon bodies was quoted by Britain and that Japan quoted the lowest for wheels and axles. Defending his decision, Mr. Stassen, who estimated that it was likely to increase the F.O.A. allocation from \$20,000,000 to \$27,000,000, added that it would not necessarily set a pattern for future contracts and that if American economy improved, his agency would return to a "strict world-wide procurement basis." In view of the pressure which obviously has been exerted on the administration by manufacturers in the U.S.A., the compromise is perhaps the only solution which could have been expected to what Mr. Stassen termed a delicate problem, but it is likely to be hotly contested both within and outside his country.

Coal Traffic

THE importance of coal traffic to the economy of British Railways can be gauged from the fact that of 288,443,000 tons of revenue-earning goods traffic forwarded in 1953, 174,704,000 tons, or 60 per cent, were coal or coke. Of 34,640,000 wagons forwarded loaded, 15,851,000 contained coal class traffic. In terms of freight revenue, this traffic yielded £108,700,000, or 41.7 per cent of the total freight receipts. Some 14,000,000 tons of coal a year are carried by British Railways for their own use, and in 1953 the canals carried some 6,885,000 tons of coal, coke, patent fuel, and peat. The British Transport Commission is thus vitally interested in coal traffic, and the future of the coal industry is closely bound up with the future of the railways.

The expansion of the coal mining industry has not kept pace with that of other industries. Since 1948 industrial production has increased by 21 per cent, but the growth of coal output by only 8½ per cent. The September *London & Cambridge Economic Bulletin* explains that industry, including the gas and electricity industries, is consuming 11 per cent more coal than five years ago; there has been no increase in consumption by households, in net exports, or in bunkers, and the railways have reduced their consumption by nearly 1,000,000 tons a year. This pattern of a rise of some 2 per cent a year in coal production, compared with a 4 per cent rise in industrial production, reflects a changing pattern of carrying trade for the railways, and is likely to be further affected by the virtual stagnation of coal output since 1952, caused in part by the extra week's annual holiday for employees first taken in 1953.

A conference of United Kingdom Chambers of Commerce to be held shortly is to discuss the question of alternative fuels, notably oil, and even on the railways themselves, oil fuel, especially diesel for shunting locomotives, is assuming importance. Increasing use of oil, as at the power stations capable of burning oil or coal, which are projected near large refineries, could have beneficial effects on railway coal traffic if coal was thereby released for other purposes, as much coal for power stations and gasworks is conveyed by ship and barge; but the record of the coal industry is such as to lead to fears that the result might well be a contraction of coal output and an expansion of oil production. The oil industry, although moving some of its products by rail, does not provide rail traffic in proportion to the extent by which coal is replaced by oil.

There are other factors which may also affect the tonnage of coal carried by rail, such as the proposed pit-head power stations and the underground gasification of coal. The effect of measures such as these is dependent on the extent to which the electricity and gas grids are extended. Other proposals, such as the coal pipeline from Birmingham to London, might affect the volume of sea-borne coal for power stations rather than railway traffics.

At present, some 75 per cent of all coal mined in the British Isles travels by rail, and British railways make considerable efforts to co-operate with the nationalised coal, electricity, and gas industries. As each industry has centralised its headquarters in London, contact between them at high levels is comparatively easy to arrange, and relationships established by the former Railway Executive have been developed by the Commission. Between the National Coal Board and the railways there are contacts at levels down to the local stationmaster or goods agent.

Provision of the wagons required by the N.C.B. is arranged on a day-to-day basis by the railway operating departments according to information originating at the collieries. The final inter-regional adjustment is made daily at the headquarters of the Commission. Inter-Regional operating conferences each morning enable traffic to be switched to alternative routes, if necessary, to avoid delays. This control has been greatly helped by the fact that all coal wagons are now owned by British Railways rather than private owners, and economies originally made possible by war-time requisitioning have been continued. Further economies are likely to arise when all coal is

carried in the new standard wagons, designed to take 24·5 tons, the maximum load which it is considered can be carried on two axles in this country. The consequent reduction both of dead-weight and the lengths of new sidings, should make the carriage of coal yet cheaper.

The proportion of collieries capable of handling these wagons is, as yet, small, and consumers' accommodation is also limited, so that, at first, until facilities for the standard wagons are spread more widely, they will be used for closed-circuit working between collieries and works which can accommodate them. The total number of mineral wagons in use at the end of 1953 was about 590,000, some 100,000 fewer than in 1947.

A change in the distributive pattern of coal since 1937 has already had its influence on the flow of coal traffic. In 1937 187,000,000 tons were used at home, and 52,000,000 tons went for bunkers and exports. In 1953, 208,000,000 tons were used at home and only 17,000,000 tons left the country. As export traffic is usually of a short-haul nature the average length of haul has risen. In 1937 net ton-miles for this traffic were 8,910,000,000, but in 1953 this figure had risen to 10,675,000,000.

Tentative plans for the 1961-65 period propose a level of coal production of some 260,000,000 tons a year. On the face of this proposition British Railways should have no cause for worry over declining traffics, but the factors

Nyasaland Railways Developments

WITH the establishment of the Federation of Rhodesia & Nyasaland and its treatment of railways as a Federal commitment, the development of the Nyasaland Railways, one of the few company-owned systems in British Africa, seems likely to enter a new phase. It is possible, for example, that the Federation will relieve the company of the Lake Nyasa steamer service, a developmental facility which is a financial burden to it and the only service which did not make a profit last year. In his statement on the company's results and operations in the year ended December 31, 1953, Mr. W. M. Codrington, Chairman & Managing Director, Nyasaland Railways Limited, was able not only to give some highly satisfactory figures of traffic increases, but also look forward with confidence to future benefits to be expected from Federal plans to stabilise Lake Nyasa and irrigate the Lower Shire Valley, schemes which should encourage agricultural production and the establishment of secondary industries.

Some of the principal results appear below:—

	1952	1953
Goods tonnage (railway) ...	278,782	330,475
Passenger journeys (railway) ...	316,547	350,604
	£	£
Goods receipts ...	474,639	531,036
Livestock & vehicle receipts ...	3,380	2,861
Passenger receipts ...	89,979	109,695
Luggage & parcel receipts ...	11,483	12,870
Gross receipts (including road and lake services) ...	652,843	750,729
Working expenses (including road and lake services) ...	547,443	609,040

The Nyasaland Government's successful drive for greater agricultural production in the Southern province brought more agricultural traffic to the railway and was mainly responsible for the great increase in the tonnage of goods carried. Speedy movement of this traffic called for strenuous efforts by the Traffic and Locomotive Departments, particularly towards the end of the year. Passenger traffic also increased noticeably. Fortunately the construction of new workshops at Limbe enabled pace to be kept with repairs accruing during the year and some arrears of maintenance work from previous years to be overtaken. Thus it was possible to keep an adequate number of locomotives and vehicles in service to meet the heavy requirements.

As the additional traffics being carried are mainly low-rated commodities, the company is striving to attract the higher-rated traffics. To this end it now runs an express already mentioned, and particularly power stations in colliery areas, may have a profound effect on the quantity of traffic to be carried.

through goods service from Rhodesia twice weekly and is negotiating with the connecting railways for a scheme for through bookings of passengers, goods and parcels.

After the Nyasaland Government agreed to finance the capital expenditure necessary to enable the railway to carry the additional agricultural production which the Government plan was fostering, the company placed orders for new locomotives and rolling stock, worth some £250,000, as the first phase of a capital programme to cover the period 1953-57. In view of the fixed price and satisfactory delivery date which it quoted, the firm of Henschel und Sohn, G.m.b.H., was awarded a contract for five "G" class 2-8-2 locomotives, four of which were delivered before the scheduled time. Rolling stock is being paid for under a hire purchase agreement with the Nyasaland Government. Works such as housing, stations, and crossing loops made necessary by the additional equipment and costing about £135,000 are being financed by the issue to the Nyasaland Government of £150,000 of £400,000 3½ per cent first debenture stock remaining to be issued.

The Nyasaland Railway is fortunate in the high proportion of modern rolling stock which it operates; almost all its vehicles are vacuum fitted. Five new tank wagons from Hurst, Nelson & Co. Ltd. were delivered in 1953 and shipment began of 30 covered bogie wagons from G. R. Turner & Co. Ltd. Two Drewry railcars on order and expected to go into service towards the end of this year will almost halve the travelling time between Beira and Limbe and provide a high standard of comfort.

Mr. Codrington rightly says that the decision of the British Government that the Nyasaland Railways should continue as a private enterprise under commercial management has been justified and has preserved the unity under combined British management of the through route from Lake Nyasa to Beira. The question of ownership came to the fore at the beginning of the 1930s with that of bridging the Zambezi in the part of Mozambique territory traversed by the company's subsidiary, the Central Africa Railway. The need to ferry traffic over the river was hindering the natural development of Nyasaland, and the Government in London eventually agreed that public money should be advanced for construction of a bridge. The bridge site was in Portuguese territory and at the time there was little enthusiasm for State ownership and management. It was decided therefore that, notwithstanding the considerable amount of public money invested for the project in the Nyasaland Railways Limited and its subsidiary, the railways should remain in private ownership and commercial management, but that the undertakings should be used as the vehicle, under suitable safeguards, for the investment of Government money. Since the Zambezi Bridge was opened the traffic of the Nyasaland Railways has increased from 76,000 to 385,000 tons a year. With few exceptions the extra facilities needed to cope with this growth have been financed either out of profits or by the issue on the London market of first debentures.

Winter Services, London Midland Region

THE outstanding feature of the London Midland Region winter services is the acceleration of the principal day trains between Euston and Scotland, which are to be put on "XL limit" timings. The 10 a.m. down "Royal Scot" will cover the 82·6 miles to Rugby in 80 min. and the 75·5 miles thence in 77 min. to Crewe; here the Perth portion will be detached, and the only remaining stop will be Carlisle, Glasgow being reached at 5.40 p.m., 30 min. earlier than last winter, but 20 min. later than in 1939. The 11.15 a.m. from Birmingham to Glasgow, which last winter preceded and sometimes delayed the "Royal Scot," is now to start at 11.25 a.m., and to follow the latter from Crewe at 1 p.m., with the "Royal Scot" Perth portion attached as far as Carlisle; the Perth coaches will be detached at Carlisle, and will continue to Perth at 4.20 p.m. in its last winter's times.

The 1.30 p.m. "Midday Scot" will run in times almost

identical with those of the "Royal Scot" to Carlisle, whence, continuing as before to call at Carstairs and Motherwell, will reach Glasgow at 9.15 p.m., 20 min. earlier; the connection from Carstairs to Edinburgh will arrive at Princes Street at 9.10 p.m., 23 min. earlier. The 1.35 p.m. from Euston to Blackpool will now become a restaurant car train for Perth with a Blackpool portion attached to Crewe; the Perth train will precede the latter from Crewe at 4.30 p.m., and stopping at Wigan, will take up from there to Carlisle the working of the previous 4.45 p.m. from Manchester Exchange, stopping at principal stations to Carlisle. The many stops north of Crewe make this a very slow service to Perth, which is not reached until 12.16 a.m., but the 1.35 p.m. is accelerated by 20 min. from Euston to Wigan and Preston, and provides a new afternoon service to Barrow, Windermere, Penrith, and Keswick.

In the up direction the 10 a.m. "Royal Scot" from Glasgow retains its summer timing of $7\frac{1}{4}$ hr. to London (10 min. faster than in the 1938-1939 winter), calling only at Carlisle, and running thence non-stop over the 299.1 miles to Euston in 318 min. The "Midday Scot," leaving Glasgow as before at 1.30 p.m., has all intermediate stops cut out except Carlisle and Crewe, from which latter point a non-stop run is made over the 158.1 miles to Euston in 155 min. The through portion from Perth at 12.12 p.m. will run as an independent restaurant car train, making the Motherwell, Carstairs, Lancaster, Preston and Watford stops of the present "Midday Scot," besides those at Carlisle and Crewe, and maintaining the latter train's current times from Carlisle to Euston.

Among other Western Division improvements, the 5.15 p.m. from Euston to Holyhead and Birkenhead is to start at 5.35 p.m., run non-stop to Stafford, 133.6 miles, in 140 min., and continue in its previous times to Holyhead, arriving at 10.55 p.m. This train, which will be called the "Emerald Isle," provides a good service for those who wish to sleep overnight in the Holyhead-Dun Laoghaire steamer; in the reverse direction the name will be carried by the 7.30 a.m. from Holyhead to Euston. The down "Ulster Express" is to continue through the winter to leave Euston at 6.20 p.m., as during the summer, calling only at Crewe and Morecambe (except on Saturdays, when it starts at 6.40 p.m.), so maintaining the 85-min. acceleration.

In the up direction, the 5.25 p.m. "Red Rose" will be accelerated 10 min. from Crewe to Euston, running the 158.1 miles in 155 min. and arriving at 8.50 p.m. The 5.50 p.m. up "Comet" is to call additionally at Watford, covering the 140.7 miles from Crewe to Watford in 137 min. but reaching Euston 5 min. earlier, at 9.20 p.m. Most of the other principal Western Division summer accelerations are to remain in effect through the winter.

Small adjustments of timings on the Midland Division main line will cut 3-4 min. from the faster schedules south of Leicester, bringing the quickest time from Leicester (the 12.29 p.m.) to St. Pancras down to 101 min. for the 99.1 miles, and from Kettering (the 9.27 a.m.) to 72 min. for the 72 miles.

The Midland Division service as a whole, however, is still far inferior in speed and frequency to that of 1939, and there has been less postwar recovery over this part of the L.M.R. than over any British main line other than the Eastern Region former Great Central line. Between St. Pancras and Leicester in the 1938-39 winter the 18 best trains averaged in time 102 min.; today the best 16 average 120 min. To and from Nottingham the average time of the best 10 has increased from 129 to 147½ min. Between St. Pancras and Sheffield there were 17 daily expresses prewar averaging 3 hr. 9 min. against 14 today averaging 3 hr. 35 min.; and to and from Manchester a service of 12 trains averaging 3 hr. 49 min. has shrunk to 10 averaging 4 hr. 40 min.

In all, the L.M.R. winter timetable contains 18 runs timed daily at 60 m.p.h. from start to stop, with a total length of 1,806 miles, as against 11 runs of 1,030 miles in the current (summer) timetables, and 68 runs totalling 6,902 miles in 1939.

June-July Traffic Trends

THE seventh issue of *Transport Statistics*, covering the four weeks from June 21 to July 18, gives details of receipts and volume of traffic, but no operating statistics. On the day of issue an official announcement indicated that the rate of advance in the country's industrial production was being maintained. The "all industries" index for June was 127 and the July figure was estimated to be 115 or 116, compared with 110 last year. Steel output was lower in July, largely because of labour trouble at Margam and a mechanical breakdown at Consett, but a record quantity of rayon was manufactured and other industries were so busy that demands for labour were brisk. British Railways, however, originated only 21,470,000 tons of freight train traffic in the June-July four-week period. That total was 721,000 tons, or 3·2 per cent, below 1953 and made the decrease during the first 28 weeks of the year 1,355,000 tons, or nearly 1 per cent.

The lost tonnage consisted of 576,000 tons of merchandise, 759,000 of minerals and 63,000 tons of coal or coke; the weight of livestock put on rail increased by 43,000 tons. The rate of decrease in merchandise is becoming serious; from 1·9 per cent in February it advanced to 5·4 per cent in July. Judging by the statement of traffic receipts for four weeks to August 15, the decline in that period was steeper still. Between February and July the rate of decrease in merchandise ton-miles moved from one per cent to 5·4 per cent also. The increase of 10 per cent in freight rates as from March 1, though subject to a maximum increase of 10s. a ton, seems to be driving much high-class traffic from rail to other modes of transport.

In the four weeks to July 18, British Railways worked 1,703,899,000 ton-miles, 38,492,000 fewer than in 1953, or 2·2 per cent. For the 28 weeks to the same date, the decrease in ton-mileage was 207,268,000, or 1·7 per cent, spread over all Regions except the Eastern and North Eastern. The Eastern moved a heavy coal traffic and altogether worked 21·4 per cent of the aggregate ton-miles. The North Eastern worked only 10·4 per cent of the aggregate, but in doing so exceeded its last year's ton-mileage by 25,892,000, or 2·1 per cent.

Over the 28 weeks aggregate to July 18, ton-miles decreased 3 per cent in the London Midland Region and 3 per cent in the Western. The Scottish Region worked 52,248,000 fewer ton-miles (4 per cent), though its tonnage was only 316,000 tons less (1·7 per cent). On the other hand the Southern lost 381,000 tons of its small freight traffic (8·8 per cent) and worked 10,244,000 fewer ton-miles (1·9 per cent). Minerals accounted for nearly half the decrease in ton-miles on the whole system.

PASSENGER TRAFFIC

The volume of passenger travel by rail did not expand during the first half of the year. In June, British Railways originated 80,704,000 journeys, 916,000 fewer than in 1953 (1·1 per cent). In the six months to June the total number of passengers was 471,779,000, a decrease of 596,000 (0·1 per cent). First class passengers in June numbered 1,533,000, an increase of 47,000 (3·1 per cent), and in the half-year 9,687,000, a decrease of 19,000 (0·2 per cent). Improved train services would not appear to have attracted additional business either in the first half of the year or in the next eight weeks to August 15.

In the four weeks to July 18 London Transport carried 42,513,000 persons by rail, a decrease of 1,915,000 (4·3 per cent). London Transport road services moved 280,896,000 passengers, 8,958,000 fewer than a year ago (3 per cent).

For 28 weeks rail and road journeys together numbered 2,236,081,000, representing a loss of 55,194,000 passengers (2·4 per cent). Road Passenger Transport continues to show an increase in each four-week period. In the July period 3,801,000 more passengers were carried, an increase of 2 per cent. This brought the increase for 28 weeks to 18,208,000, or 1·5 per cent, the Scottish Group gaining rather more business in proportion to its size than the Tilling Group.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Diesel Passenger Services

August 31

SIR.—The Chief Public Relations & Publicity Officer of the British Transport Commission, Mr. J. H. Brebner, stated in his letter published in your July 9 issue that the installation of reversible seats in British Railways' new diesel trains would have entailed a loss of about 15 per cent in the seating capacity of each two-car unit.

I would point out that in the electric stock on the Manchester-Bury line there are some coaches, originally first class but now partly first and partly third, in which all the seats are reversible and very comfortable, with ample leg room. I have measured the distance between seats, centre to centre, on these cars and also on one of the new diesel trains in service in the North Eastern Region between Leeds and Bradford, and the difference is a fraction above 1 in. This is not 15 per cent, nor does it even approach that figure.

In a recent journey of some 5,000 miles on the Continent I saw no vehicles, old or new, in which all the passengers have to sit back to the direction of travel. New light railcars in Germany have reversible seats, one class only. I was in such a vehicle on a journey involving a reversal; the occupants of every seat except one rose and turned the seats back. It is nonsense to say that most people do

not care which way they travel. Why not build buses with half the seats facing backwards?

Yours faithfully,
NORMAN N. FORBES

39, Oakdale Road, Liverpool, 22

Communication Between Driver and Guard

September 4

SIR.—The report of the Longniddry Junction accident in your issue of September 3 serves to call attention to the serious consequences which may arise from the fact that, on a train not fitted with continuous brakes, the guard has no effective means of communication with the driver in case of emergency.

This deficiency could be remedied at no great expense by providing every goods brake van with a powerful hand-operated klaxon horn of the type carried by small sailing craft for use in fog. Instructions would be issued that on hearing such a horn, any driver should stop his train immediately and any signalman should act as if "obstruction danger" had been received.

Yours faithfully,
M. D. MORGAN

The Old Manor, Loughborough Road,
Walton-on-the-Wolds, Loughborough

Publications Received

Locomotive Management: Cleaning, Driving, Maintenance. By Jas. T. Hodgson and Chas. S. Lake. Tenth Edition, revised by W. R. Oaten. London: Tothill Press Limited, 33, Tothill Street, S.W.1. 8½ in. x 5¼ in. 512 pp. Illustrated. Price 12s. 6d.—This, for many years recognised as the standard text book on all matters connected with the management of locomotives, has now been revised to include details of British Railways standard locomotives and additional information on poppet valve gear. There has been a considerable revision of the illustrations and many new photographs and diagrams are included; in all, there are 295 illustrations. Further revisions have been made to the chapters dealing with shed regulations, clearing house rules and colour-light, semaphore, lamp, and whistle signals. These, with the examinations on them, are now in conformity with current regulations. There are 22 chapters and several appendices, and the whole of the field is well covered. The comprehensive index is of great assistance in finding information among the copious detail given in this book, which should continue to serve the needs of the locomotive men of today as well as it has in the past.

Electric Locomotives.—Under the title *Henschel Elektrische Lokomotiven*, a new multi-coloured brochure has been issued by Henschel & Sohn G.m.b.H. In the German language, it illustrates and gives brief technical particulars of the

more notable electric locomotives built at Kassel, including the E.10, E.19 and E.94 classes of the German Federal Railway; 3,000-V. d.c. locomotives for South Africa and Chile; and numerous *abraumlokomotiven*, including the latest type with 30-ton axle load.

Fourways Conveyors.—An illustrated booklet, giving an indication of their wide range of conveyors, both portable and fixed installations, has been issued by Fourways (Engineers) Limited, Thornwood Common, Epping, Essex. Particulars of some eight different models are included, each of which is produced in different designs and capacities; several of these are shown in operation loading transport vehicles. The capacities of the various types range from four to 15 cwt., and boom operation is by hand winch or hydraulic power. All are electrically operated by push-button starter, with reversing and isolation switch.

Permanent-Way Materials.—Much useful information on permanent way equipment, layouts, accessories, and so on, is contained in an illustrated booklet issued by the Railway & General Engineering Co. Ltd., Midland Works, Nottingham. Most permanent way layouts require individual study, and the contents include diagrams of switches, crossings, and turnouts of a general range, which represents equipment used in a variety of different applications. Technical staff are available to discuss specific design problems. Included in the booklet are a number of diagrams and calculations, including lead calcula-

tions for British Railways standard layouts, and sub-standard layouts suitable for collieries and works.

Septimo Congreso Panamericano De Ferrocarriles. (Seventh Pan-American Railway Congress.) Six volumes. Mexico: Estados Unidos Mexicanos (Secretaría de Comunicaciones y Obras Públicas), 9½ in. x 6½ in. x 1½ in. In Spanish. Paper covers. No price stated.—The Seventh Pan-American Railway Congress was held in Mexico City from October 10-20, 1950. The transactions have now been published in Spanish in six volumes, forming a most comprehensive account of railway practices in North, Central and South America.

Géographie Universelle des Transports. Tome II: Géographie des Chemins de Fer d'Europe. Vol. II: Belgique, Hollande, Grand-Duché de Luxembourg, Espagne, Portugal. (Universal Transport Geography. Vol. 2: Geography of European Railways. Part 2. Belgium, Holland, Grand-Duchy of Luxembourg, Spain, Portugal.) By H. Lartilleux. Paris 9e: Librairie Chaix, 20, Rue Bergère.—11½ in. x 8 in. 254 pp. Illustrated. Price not stated. In text, photographs, maps and diagrams this, the second book in Volume 2 of this work, fully maintains the high standard of previous parts, of which the first four in Volume 1 described the railways of France and French overseas territories and the first in Volume 2 those of Switzerland and Italy. All have been reviewed in our columns, the Switzerland-Italy book in our May 9, 1952 issue.

THE SCRAP HEAP

Mongoose Hunt Holds up Train

A Holborn Viaduct to Ramsgate train was delayed for nearly 20 minutes by a mongoose. Consigned to a show in Ramsgate, the mongoose escaped from its cage in the guard's van shortly after the train left Holborn Viaduct.

At London Bridge, the first stop, efforts were made by station staff for 10 minutes to catch the animal, without success. The train then continued its journey with the guard still trying to get the mongoose back into its cage.

At Strood Station, where another attempt was made, a shunter who went to the assistance of the guard managed to catch the mongoose and put it back into its cage after the train was delayed for another 10 minutes.—From "The Star."

A Sign of the Times

Removal of a sign from a London Transport, Piccadilly Line subway at Kings Cross Station early last month revealed a notice, remarkably well preserved for its age of nearly half-a-century, giving warning that electric trains would begin running on both tracks daily as from December 3, 1906, and so marking completion of the Great Northern, Piccadilly & Brompton Railway, now part of the Piccadilly Line.

The G.N.P. & B.R., at the time the longest tube railway in London, was the second of three constructed by the Underground Electric Railways Company of London, the others being the Baker Street & Waterloo (now the Bakerloo) opened in March, 1906, and the Charing Cross, Euston & Hampstead (now part of the Northern Line) opened in June, 1907. It was opened for public service on December 15,

1906; the ceremony was performed by Mr. David Lloyd-George, then President of the Board of Trade.

Tribute to Liverpool Street

The West side was opened in 1874 . . . and it is one of the youngest of London's termini. The cramped layout below ground level and the smoky tunnels leading to it must be blamed on the legislators of 1870 who refused to permit a well-ventilated elevated terminus so close to the City. The alterations carried out in 1936-49 have done as much as possible to overcome the legacy of the past.

This station operates a modern electric train service, which has emulated the former G.E.R. reputation for clockwork regularity, and which is now being extended further afield. It also operates steam trains with a headway of only 2 minutes, and all signalling is electric colour-light.—R. F. Youell in a letter to "The Daily Telegraph."

Engine Driving by Contract

The strike of the drivers upon the southern division of the L.N.W.R. is virtually at an end. For some time past discontent has been manifested respecting the permission given to men to work their engines by contract—that is, that the men may, if they please, agree to work their locomotives at so much per mile, they paying for coke (charged at cost price), tallow, and oil; also paying their firemen, cleaners, and making good any such small repairs as may not require the engines to be taken into the shed. This system of contract necessarily brings out the skill and care of the men, and those who can best econo-

mise the consumption of coke, and keep their engines in good order, of course, make the largest amount of profit. In many cases the contract men have made their ordinary wages, of from 50s. to 60s. per week, and have had, at the end of a month's working, a surplus of £6, £8, and £10, and as much as £14, in addition, besides saving the company a considerable amount. The contract men are all guaranteed their usual wages, but to "make money" they must be good drivers. . . . Complaints arose against the contract system, and it is alleged that the results of the working under it were dishonestly given; that the contract men stole coke . . . ; that the locomotive foremen favoured the contract men, and that by studied annoyance and arbitrary conduct towards the non-contract men an attempt was being made to drive the latter to work their engines under the new system.—From "The Manchester Guardian," August 16, 1854.

Excelsior!

(See The Scrap Heap of August 20)

In placing pertinacious A.C.P.
Among the pundits of modernity
Could I have had in mind some bearded
youth,
Hailing each new idea as proven truth?

I must have erred at any rate, for, lo,
Apparently he has been on the go
Quite long enough to cite nostalgically
The "good old days" pre-1923.

He seems to think the old amalgamation
Was an excuse for South-Westernisation;
But for the signs of chafing 'neath the
chaff
I might retort in kind: "Don't make
me laugh!"

I also well remember all the fuss
When boat trains changed their London
terminus;
Though Waterloo's vast concourse
made no claim—
Doubtless the old South-Western got
the blame.

Poor chap, to think that paint should
have such sway!
It does affect weak tummies, so they
say,
But, if South-Western paintwork
turned him green
(With envy, possibly) it could be seen.

Beneath his critic's cloak I think you'll
find
Someone as sentimentally inclined
As I'm supposed to be—a diehard, too,
It all depends upon the point of view.

In any case what's wrong with senti-
ment?
At least it shows we're not indifferent.
We'd better call an umpire in to settle
Which of us is the pot and which the
kettle!

A. B.



Notice at Kings Cross, Piccadilly Line, revealed by removal of sign

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

New Works at Durban

Large-scale works being undertaken at Durban include the erection of new workshops, a marshalling yard, electric running sheds, additional platforms and additional traffic facilities at Durban Station. The marshalling yard and the running sheds are being erected at the Durban bayhead where a large area has been reclaimed. The first stage of the work connected with the marshalling yard should be completed by the end of the year. The total estimated cost is £2,312,150.

An amount of £251,100 has been set aside for improvements at Durban Station. Additional platforms, a new forwarded parcels office, a new signal-box and additional office accommodation are being provided. The work will be completed early next year and £47,500 will be spent during the 1954-55 financial year.

The new electric running sheds are being built at Umbilo at an estimated total cost of £344,000 and new substations and improved overhead track equipment are being provided in the Durban area at a total cost of £164,850.

As a result of the improved platform facilities and the introduction of barrier control, Durban should find it easier to cope with its ever-increasing passenger traffic. During 1953, 637,443 tickets were issued from Durban (including branch line tickets), an increase of 6,377 over 1952. During the

first five months of this year 262,666 tickets were issued.

Barrier control has been found most effective in the Reef area, and should be equally so in Durban. Barriers will soon be installed at several stations and it is hoped that the system will be introduced in the near future. On the Reef the increase in revenue during the first week after the introduction of the barrier control amounted to over £15,000. The system will be introduced at the following stations: Durban, Rossburgh, Umbilo, Congella, Dalbridge, Berea Road and Greyville.

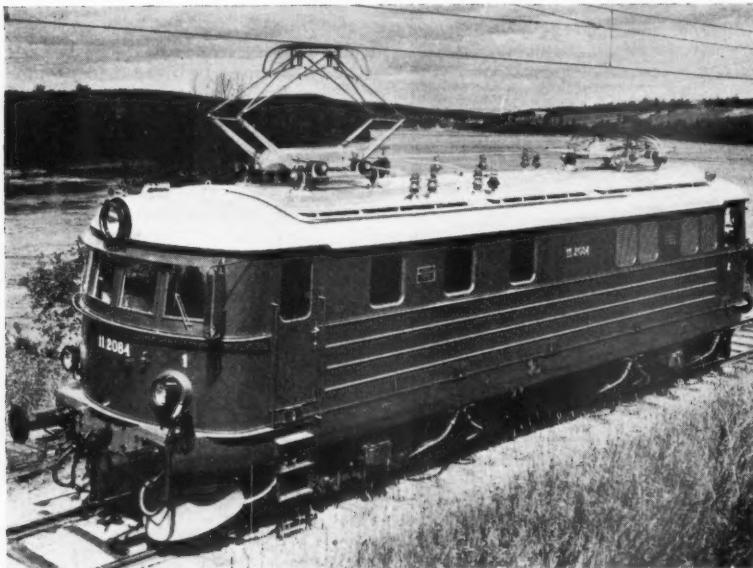
INDIA

Expansion Scheme at Bezwada

The Central Government is reported to have sanctioned Rs. 9,824,000 for remodelling of the yard at Bezwada on the Southern Railway Madras-Waltair (Calcutta) line, and the junction for the Grand Trunk express route to northern and central India and for the branch to Masulipatam. This is part of a larger scheme for increasing transport capacity on the Madras-Bezwada section, one of the most intensively worked sections in the country. After completion of the scheme the number of wagons operating on the section daily is expected to increase from 300 to 420.

Under the new scheme a single hump and a single yard both for reception and despatch of wagons will be provided. The marshalling yard will consist of 26

New Norwegian Electric Locomotive



One of a batch of new Bo-Bo electric locomotives built in Norway and intended to be the future standard type for the State Railways electrified lines. The total horsepower is 2,160

lines with a single hump-shunting neck and two rear-shunting necks for moving and placing of marshalled loads on the despatch line.

The scheme leaves existing local goods yard and sorting lines undisturbed. A through connection for movement of local goods to and from the new marshalling yard will be provided.

Other works designed to increase transport capacity on the Madras-Bezwada line are extension of loops and additional crossing stations on the section, costing Rs. 22.5 million, and are in progress. Conversion of the Gudur-Renigunta section into broad-gauge at a cost of Rs. 20 million has also been sanctioned for the same purpose.

NEW ZEALAND

New Railcar Depot

Work is to begin almost immediately on a new railcar and diesel locomotive repair and servicing depot at Auckland. A tender for the work has been approved and the building is expected to be completed within seven months. The cost of the building, land, sidings and incidental works is expected to be about £120,000. The building will have an area of 22,000 sq. ft. It will be divided into an inspection bay, repair bay, fitting and engineering shop, and staff rooms.

Nelson-Glenhope Line

The Minister of Railways announced in Nelson on April 26 that the service on the Nelson-Glenhope line was to be suspended. The service ceased in fact on June 12.

Inhabitants of the Nelson Province, by public demonstration and more than 12,000 signatures to a petition, strongly opposed this decision and, through the Nelson Provincial Progress League, urged that the service be restored. In response to these representations, Mr. S. G. Holland, Prime Minister, said on June 15 that the service would be resumed if traffic totalling a minimum of 25,000 tons a year were guaranteed. On July 31, Mr. Holland was handed the guarantees and the Government has approved the resumption of service.

UNITED STATES

Railcars for the Boston & Maine

The largest single order ever given for railcars in the United States has been placed by the Boston & Maine Railroad with the Budd Company. It is for 55 85-ft. diesel-hydraulic cars, 42 of the RDC-1 type and 13 of the RDC-2 type; together with 12 additional diesel-electric locomotive units, this will call for an expenditure of \$11,200,000.

The passenger service of this railway will be revolutionised; 235 older-type suburban coaches and 75 steam locomotives are to be scrapped, and the rail-

cars will take over, in multiple-unit assemblies ranging from two to six cars. Today a total of 42 Boston & Maine daily trains is operated by railcars and with the delivery of the cars on order, this will be increased to 170 trains daily and will make the B. & M. the largest railcar user in the United States, with more cars of this type than all other U.S.A. railways put together.

The new railcars will be used mainly in the services between Boston and Portsmouth, 51 miles, Rockport, 35½ miles, Haverhill, 33 miles, and Lowell, 25½ miles, and are expected to make possible a saving in operating costs of \$1,700,000 annually. Morning and evening rush hour service still will be provided by conventional trains with diesel-electric locomotives.

New L. & N. Yards

The Louisville & Nashville Railroad is planning to spend \$21 million on new marshalling yards at Louisville, Kentucky, and Birmingham, Alabama. Tentative plans for the Louisville yard, which will be at Strawberry Hill, call for 56 classification tracks, with a total capacity of 2,200 bogie wagons; 14 receiving tracks, capable of handling 1,200 wagons; and a 16-track departure track, to hold in all 1,841 wagons. Approximately \$1 million will be spent on a new goods station on the Ashbottom Road, a two-storey structure 1,100 ft. long, which will replace the present Ninth Street depot and eliminate the handling of stop-over wagons between there and the present Strawberry Hill yard.

The Birmingham scheme is a little more in the future, but may get under way this year. It will comprise a yard of 4,000 wagons capacity, with 48 classification, 13 receiving, and 12 departure tracks.

ARGENTINA

New Railway Policy

The adoption by the Argentine Government of a new policy as to the operation of the nationalised railways seems to be imminent as the result of a recent resolution of the Ministry of Transport accepting a suggestion put forward jointly by the Unión Ferroviaria (Railwaymen's Union) and La Fraternidad (Enginemen's Union). The two main points envisaged are the restoration of the autonomy of the individual lines and the participation of railwaymen in their administration. It is hoped by this means to reduce the annual deficit which is at present met by allocations from general funds.

A mixed committee has been set up consisting of three representatives each from the Ministry of Transport, the State Transport Undertaking, the Unión Ferroviaria, and La Fraternidad; and one each from the Ministry of Economic Affairs, the Ministry of Technical Affairs, the Ministry of Labour and Social Welfare, the C.G.T. (General Confederation of Labour), the C.G.E.

(General Economic Confederation), and the State Control Department.

Sub-committees have been named as follows: Organisation; Technical Aspects; Administrative Aspects; and Economic Aspects. Final recommendations are to be made within a period of 90 days. The initial meeting was held on July 31.

IRELAND

Diesels on West Cork Line

The diesel trains now working between Cork, Bantry and Skibbereen have attracted much new traffic. Patronage is particularly good on days when reduced fares are available, and at weekends. The trains are also stimulating tourist traffic to Glengariff and Bantry Bay.

SWITZERLAND

Resignalling the Berne-Lucerne Line

To cope with increasing traffic over the important line between Berne and Lucerne via Langnau, the Swiss Federal Railways have been carrying out since 1950 a complete programme of resignalling which has just been completed. Between the junction with the Berne-Thun main line at Gümligen and the Sentimatt junction at Lucerne, the line is single track throughout, and has to deal with about 50 train movements daily, increased to 120 trains through Langnau, used also by the trains of the Emmental-Burgdorf-Thun Railway.

The new block working is on the continuous current Integra system, and at a number of the stations the previous manual signal working has been replaced by electric frames, with illuminated track diagrams, and colour-light signals; at other stations, where the mechanical frames were comparatively new, the change has been confined to the substitution of colour-lights for semaphores. At the junctions of Konolfingen and Wolhusen, where track changes are in prospect, replacement of the signal-frames has been deferred until new plans are complete. Further plans include the laying in of additional passing loops at Bowil, Doppleschwend, and Schachen.

FRANCE

Training of Electric Locomotive Drivers

In connection with the electrification on the 50-cycle a.c. system of the Valenciennes-Thionville line, courses of training have been carried out at the Mohon Depot. It was necessary to have some 280 staff, including 80 drivers, ready for practical work by July, 1954, and, to avoid interruption to existing services by having too many under training at any one time, the instruction classes began in October, 1952.

Instruction was divided into two main stages. For drivers, there was first a six weeks' course at Mohon on d.c. electri-

fication followed by a week working on d.c. locomotives in the South-Eastern Region; this stage was completed by January 1 last. For workshop staff the instruction at Mohon occupied seven weeks. An instruction coach, containing specimens of the principal apparatus used on d.c. locomotives, was constructed.

The second stage involved for drivers a four weeks' course at Mohon on the technicalities of 50-cycle a.c. electrification, followed, when the Valenciennes-Thionville locomotives were delivered early in July, 1954, by eight days practical training on the locomotives. For workshop staff there was again a four weeks' course at Mohon followed by practical training in the aspect of the work in which they were specialising.

NORWAY

Shortening the Oslo-Drammen Line

To the south-west of Oslo, the single-track main line to Drammen has to make a considerable detour round the promontory between Asker and Brakeroya. Because of increasing traffic, the doubling of the line from Oslo via Asker, Lier, Brakeroya and Drammen to Hokksund is considered necessary. Doubling between Asker and Brakeroya would be extremely costly, however, and though giving the desired increase in line capacity, would not result in a worthwhile decrease in journey time.

The Drammen District of the State Railways has investigated three schemes, all based on the construction of a tunnel from Asker to different points west of the promontory. In each case a separate investigation has been made to determine whether the tunnel should be constructed as a double-track tunnel, or as a single-track tunnel with a remote-controlled crossing loop inside the mountain.

State Railways Scheme for Tunnel

The scheme supported by the headquarters administration of the State Railways, and to be submitted to Parliament next Spring, is for a straight-line single-track tunnel, 6½ miles long, from immediately south-west of Asker to near Sorumsasen in the district of Lier. Near the halfway point of the tunnel, there would be a crossing loop about 550 yd. long, with points remote-controlled from a signalbox outside the tunnel. As the tunnel would be used only by through trains, while local trains would continue to use the existing line, the construction of a single-track tunnel with crossing facility is considered sufficient. If the tunnel were built as a double-track structure throughout, its cost would be increased from Kr. 50,000,000 to 60,000,000. It is considered that the Kr. 10,000,000 could be better spent by laying double track as far beyond Drammen as possible.

The tunnel will reduce the through journey time between Drammen and Oslo from just under an hour to 40 min. The average gradient in the tunnel will be 1 in 100.

Train Speed Calculator

Designed to simplify the "step by step" method of calculating speed-time-distance performance data

By S. D. Van Dorp, A.M.I.Loco.E.
Traction Projects Engineer, the English Electric Co. Ltd.

MANY analytical, graphical,¹ geometrical,² and mechanical³ methods have been developed to assist the traction engineer faced with the laborious task of determining train performance for a given duty. For extensive investigations an electrically-operated integrating machine such as the S.N.C.F.-Amsler train schedule computer⁴ is of course a better solution; it can perform in a few days the work which would take months by other methods, but such apparatus is not often available.

All these systems have advantages and disadvantages, but except possibly where a very large number of curves have to be drawn up based on one motor characteristic and train weight, it is generally found that the "step by step" analytical method is the most convenient way of calculating speed-time-distance performance data. With this method each step consists of determining increments of time and distance for an assumed increment in speed.

The time taken to accelerate or retard the train through this speed increment depends on the average accelerating tractive effort available. This is the resultant of all the forces acting on the train over a given section of the route and their magnitude is determined at the mean of the speed increment. These forces comprise tractive effort at the wheel tread, train, curve and grade resis-

To reduce the number of operations a special slide rule has been developed, which is illustrated diagrammatically in simplified form. There is a separate scale for each of the variable quantities involved and the scales are arranged to incorporate the constants in the equations shown. Consequently the number of operations is reduced to a minimum and in nearly all cases the whole of one step in a calculation is visible at one setting of the slide and the position of the decimal point is indicated on each scale. The choice of the correct increment can therefore be made quickly by inspection, and without writing anything down. The time taken to calculate each step and the risk of making arithmetical errors is reduced accordingly, and the work is made less tedious. These advantages will be readily appreciated by all traction engineers familiar with speed-time-distance calculations.

From first principles it can be shown that a force of 102 lb./long ton produces a linear acceleration of one m.p.h.p.s. In order to allow for the inertia of the rotating parts, this figure becomes 108 to 112 depending on the type of vehicle. This is equivalent to an increase in weight of the train during acceleration. Experience has shown that it is reasonable to use an acceleration factor of 110 for all classes of vehicles, and the relation between the scales concerned is based

$$(1) T(\text{seconds}) = \frac{\Delta V(\text{m.p.h.}) \times 110}{F(\text{lb./long ton})} = \frac{\Delta V(\text{m.p.h.}) \times 98.214}{F(\text{lb./short ton})} = \frac{\Delta V(\text{km/h.}) \times 30.514}{F(\text{kg./metric tonne})}$$

$$(2) T(\text{seconds}) = \frac{S(\text{miles}) \times 3,600}{V(\text{m.p.h.})} = \frac{S(\text{yards}) \times 2.0454}{V(\text{m.p.h.})} = \frac{S(\text{km}) \times 3,600}{V(\text{km/h.})}$$

where equivalents are:

One long ton = 2,240 lb.; (one short ton = 2,000 lb.) and One metric tonne = 1,000 kg. and basic conversion factors are:

One lb. (avoirdupois) = 0.4536 kg. and one in. = 25.4 mm.

tance. The distance travelled depends on the mean speed and the time. The various steps are normally tabulated, and when required, performance curves can be plotted.

Increments of Speed

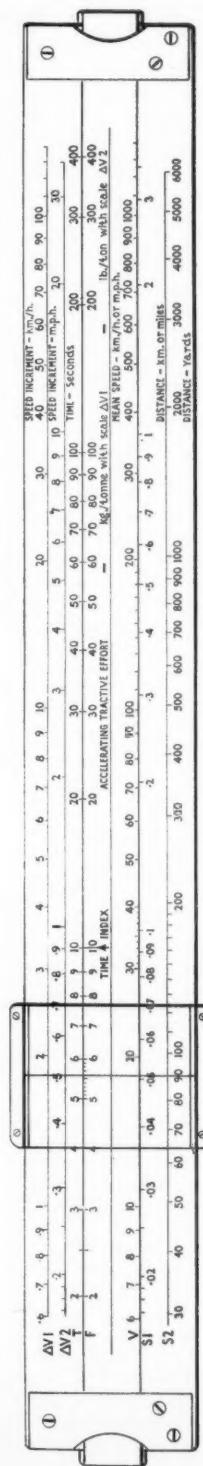
Small increments of speed, time and distance are necessary to ensure reliable and accurate results. The correct increment of speed to result in the running of a given distance can in practice only be found by trial and error. More than than one attempt is often necessary before the correct speed increment is found. This is mainly due to the fact that when using a normal slide rule for this theoretical form of train driving, the time taken for each step has to be calculated from equation (1) before the distance is obtained from (2) and several slide and cursor movements are involved. These equations are detailed in the various units normally employed.

on this figure. The metric and U.S. equivalents will be found in the equations (1).

Calculations must of course be made either entirely in British, U.S. or metric units throughout. The rule is not designed for use with units of weight from one of these systems combined with units of length from another. The operation of the slide rule is explained by working through a few example calculations, and by reference to the illustration. The examples are worked in British units.

First Example

A three-car multiple unit train comprises one motor coach having all four axles motored, and two trailer coaches. The fully laden weight of the unit is 160 tons or 40 tons per motor. The train has reached 30 m.p.h. and is accelerating on level tangent track. Determine the time taken and the distance travelled



A diagrammatic illustration of the special slide rule in simplified form. The slide rule was made for the English Electric Co. Ltd. by Blundell Rules Limited

during an increment in speed of four m.p.h. to 34 m.p.h.

From the motor characteristic, obtain the tractive effort per motor at a mean speed of 32 m.p.h., say, 3,280 lb. per motor or 82 lb./ton. From the train resistance curve find the tractive resistance at this speed, say 8 lb./ton. It is usually advantageous to prepare a nett tractive effort-speed curve combining tractive effort and train resistance for the total train weight under consideration and plotted in lb./ton against m.p.h., thus eliminating one set of readings and additions to be made at each step of the calculation. For the example in question the net tractive effort is 74 lb./ton and since curve and grade resistance is zero the accelerating tractive effort is also 74 lb./ton.

Set cursor over speed increment of four m.p.h. on scale ΔV_2 . Move slide until 74 lb./ton on scale F is under the long central cursor hair line, and read time on scale T = 5.95 second against time index (at 10 on scale F). (Use short hair line over scale F only when working in U.S. units, that is lb./short ton). Without moving the slide, move the cursor to 32 m.p.h. on scale V and read off distance = 0.0529 mile on scale S1, or = 93 yards on scale S2.

In the second example the same three-car train is running at a speed of 50 m.p.h. when it strikes a rising gradient of one in 70 or 1.43 per cent and 0.8 miles long. Determine the final speed at the end of the gradient and the time taken on the gradient. Grade resistance = 32 lb./ton. Train resistance at 50 m.p.h. is, say, 13.2 lb./ton. Therefore total resistance to motion is 45.2 lb./ton. The tractive effort at 50 m.p.h. is, say, 1,260 lb./motor = 31.5 lb./ton. Therefore the tractive resistance is 13.7 lb./ton greater than the tractive effort and the train speed will drop.

Assume a reduction in speed of, say, five m.p.h. over this distance. If this is correct, then the mean speed will be 47.5 m.p.h. and the tractive effort per motor, say, 1,400 lb., or 35 lb./ton. At 47.5 m.p.h. the train resistance is, say, 11.6 lb./ton and therefore the total resistance to motion is 43.6 lb./ton. Therefore the accelerating tractive effort = -8.6 lb./ton. Set the cursor to 0.8 miles on S1 and move the slide until the mean speed of 47.5 m.p.h. on V coincides with the cursor hair line. Without moving the slide, move the cursor until the long hair line is on 8.6 lb./ton on F and obtain speed increment of 4.75 m.p.h. on ΔV_2 . Therefore the actual

drop in speed will be between 4.75 and five m.p.h. and the final speed at the end of the gradient will be between 45 and 45.25 m.p.h. Tractive effort, tractive resistance and mean speed can readily be corrected if a closer approximation is required, and the time can be read on scale T opposite the time index, and will be about 6.6 seconds.

The scales selected for the reverse side of the slide rule are chosen not only for their general usefulness, but also to enable energy consumption and r.m.s. current calculations for a given traction duty to be performed with the same instrument. These are the normal A, B, C, D and E reciprocal scales with extensions, and two log-log scales. The slide rule has been manufactured for the English Electric Co. Ltd., by Blundell Rules Limited, Luton to whom all inquiries should be addressed.

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New Yards and Station at Mount Gambier, South Australia

Improvements as a consequence of gauge-conversion in south-east of the State

AN account of the gauge conversion of most of the South-Eastern Division of the South Australian Railways and the inauguration of broad gauge services between Adelaide and Mount Gambier appeared in our August 7, 1953, issue.

The platform of Mount Gambier Station is to be extended to give a total length of 750 ft.; the old original station building to the east of the present building is to be demolished. The locomotive sheds situated near the station and formerly used for narrow-gauge engines have been removed. A new signalbox and an umbrella-type shelter 100 ft. long are to be erected on the extended platform.

On the north side of the station platform a 3-ft. 6-in. gauge line has been built for Millicent and Beachport branch passenger trains, still narrow gauge. Opposite the station a new goods shed 240 ft. long giving 6,000 sq. ft. of floor area instead of the former 1,800 ft. is in course of erection. A new goods platform 100 yd. long is to be provided.

New broad-gauge tracks have been laid in the station yard and the layout of both tracks and goods sheds has been designed to give maximum track capacity and avoid previous congestion of motor vehicles collecting and despatching goods by rail. Road entrances are provided at both ends of the yard.

This work is being undertaken on the site of what were the marshalling yards in the days of narrow-gauge working. The main line to Adelaide runs from Mount Gambier Station westwards for about a mile and a half, and then swings north towards Naracoorte. About this point the junction for the Beachport branch leaves the main line and leads north-westwards. It is between the Mount Gambier Station and this junction that the new marshalling yards are situated. They and the new locomotive depot are connected by two tracks to Mount Gambier Station and occupy 14 acres. When completed they will be the largest and most fully equipped in the State south of Tailem Bend on the main Melbourne-Adelaide line.

Mixed Gauge in Yard

Both broad- and narrow-gauge tracks have been laid in the yards and a large roundhouse with nine bays has been erected. Both steam and diesel locomotives are handling broad gauge trains. As at Naracoorte, an 85-ft. turntable has been installed for locomotives of both gauges, with engine pits, coal loading equipment, water standards and a new water tower of large capacity. A new 70-ton weighbridge has also been provided; in addition there will be the necessary offices, stores and a dining room for staff.

With its new and extensive marshalling yards and station improvements,

Mount Gambier is being transformed into a modern passenger and freight terminal.

VISIT TO VULCAN FOUNDRY LIMITED.—On August 27 a visit to Vulcan Foundry Limited was made by Señor Don Manuel Barrau, Bolivian Ambassador, who was accompanied by Mr. R. H. Dobson, Managing Director of the Antofagasta (Chili) & Bolivia Railway Co. Ltd., and other directors and officials of that company. The party saw the steaming of the first of the 16 4-8-2 locomotives which are now being built by Vulcan Foundry Limited for the Antofagasta (Chili) & Bolivia Railway Co. Ltd.

TELEVISION BROADCAST FROM A RAILWAY SHIP AT SEA.—On September 26th Television Outside Broadcasts will, for the first time, transmit from a moving ship at sea when cameras are installed in British Railways motorcar ferry Lord Warden. Viewers will see the operation of manoeuvring the 3,333-ton ship out of Boulogne Harbour. Once at sea the cameras will show something of life on board. The equipment of a B.B.C. mobile television control room will be installed near the stern of the Lord Warden, below the boat deck. The vision programme will be transmitted from a combined power transmitter and aerial vehicle in the stern. The programme will be received at Swingate on the cliffs above Dover and sent to London over the radio links set up for television relays from the Continent.

Rebuilding War-Damaged Bridges in Thailand

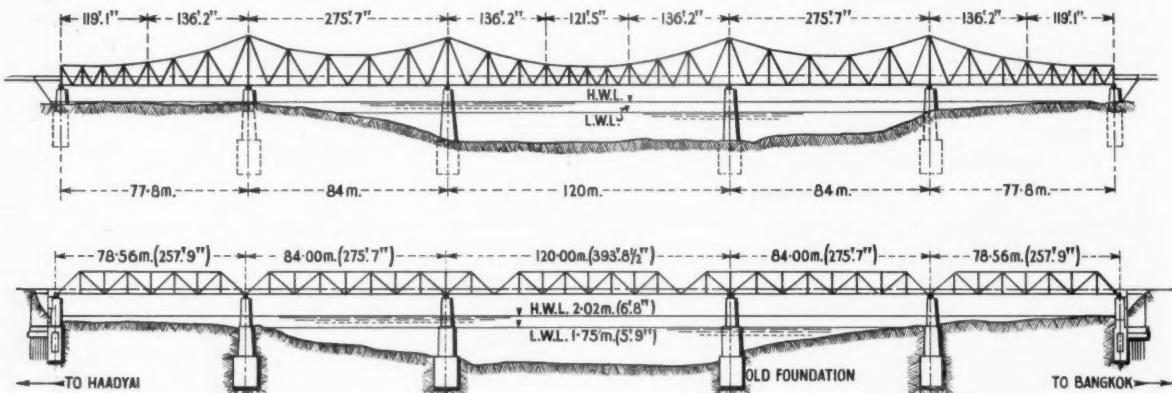
The design of the new superstructures for the Rama VI, Surat, and Bandara Bridges, and demolition and repair works

TOWARDS the end of the 1939-45 war three key bridges on the Thailand State Railways were demolished by Allied air bombing. They were (1) the Rama VI Bridge connecting Bangkok City with the important international southern line to Malaya, (2) the Surat Bridge also on that line and about 400 miles south of Bangkok, and (3) the Bandara Bridge some 200 miles north of the capital on the line to Chiengmai, the

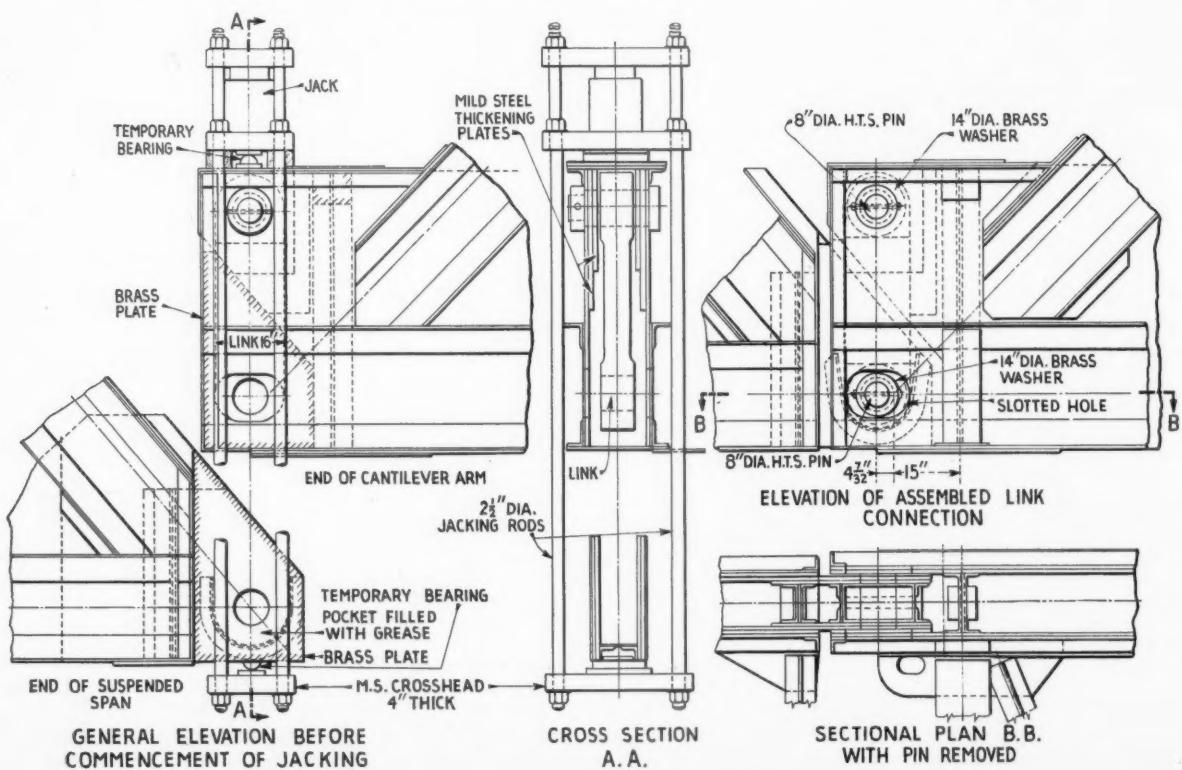
old northern capital. As temporary measures to restore traffic movement, wagon ferries were established at the sites of (1) and (2), and a temporary trestle bridge was built at (3). Meanwhile much of the damaged superstructures of the old permanent bridges lay partly or wholly on the river beds and some of the piers and abutments were seriously damaged and displaced.

In spite of the almost certain diffi-

culties this debris and reconstruction would cause, the railway administration decided to rebuild the bridges permanently on the old centre lines, as in every case the river banks are low and building on new sites would have involved costly long new approach embankments. In December, 1948, it invited competitive international tenders for the design, fabrication and erection of the new superstructures, and for repairs to and



Elevation of Rama VI Bridge, Bangkok, as originally built (above), and as reconstructed



Detail of suspension link and erection fittings (left) and of assembled link connection used in two of the bridges

strengthening of the substructures of the three bridges.

The design and construction works involved are described in a paper recently presented to the Institution of Civil Engineers by Messrs. O. A. Kerensky and K. E. Hyatt, its title being "Design and Construction of Rama VI, Surat, and Bandara Bridges in Thailand."

At the outset it was clear that—unlike the Japanese Warren (Rama VI) and Bandara) and curved chord (Surat) trusses of the old bridges—the new through trusses would have to suit present-day methods of fabrication and erection.

In fact, parallel-chord trusses of the Warren type with verticals were adopted throughout all the three bridge designs, as giving simpler connections to top laterals and cheaper fabrication than

Rama and one at Surat. To cater for the eccentricity of the loading, therefore, the two trusses in each span though composed of similar types of member, had to have component parts that varied considerably in thickness. At the Bandara Bridge there is no roadway and only one cantilevered footway, so that comparatively closely-spaced identical trusses could be used in each span.

Rama VI Bridge

The old Rama Bridge was 443·6 m. (1,455 ft.) in length between abutments and the span lengths are shown in the diagram; the main trusses were 10 m. apart. In the new bridge, though the widths of the openings are the same as in the old, the spans are differently arranged, there being three almost identical simple spans of about 255 ft. one of them suspended in the central

track are underslung fish-belly girders and those under the roadway are 18-in. joists. This avoids loosening of rivets connecting the stringers to the cross-girders and the cross-girders to the main trusses, due to strains set up by interaction between the deck and trusses.

A diamond system of lateral bracing is used for both top and bottom chords, as the lateral diagonals are unaffected by stresses in the chords. Sway frames are provided at each panel point.

The position and design of the bearings carrying the suspended span are also unusual. To avoid the difficulty normally experienced of combining the suspension pin and the end of the cross-girder, they are arranged eccentrically to the panel point, one on each side of it. This also provides a clean and simple connection with a long suspension link at the expansion end. The



Before rebuilding: (left) Rama VI Bridge, looking south, showing all except north abutment; (right) Surat Bridge, looking west across river upstream

would have been the case had slightly lighter trusses with curved chords been used in these bridges.

Designs to Secure Economies

To enable greater live loads to be borne by the old foundations, the new superstructures were lightened as much as possible by the extensive use of high-tension steel (B.S. 548). This policy also secured substantial economies in costs, and particularly in freight charges, which in 1949, were 31·45 per cent of the basic costs of plain mild steel.

In consideration of the acute steel situation in the United Kingdom at that time, variations in sections were reduced to a minimum by making all three bridges as similar as possible. For the Rama and Surat Bridges, where the loadings are almost identical, virtually the same panel-lengths and similar types of member were used throughout, so that large tonnages of each section could be ordered. At both of these bridges there is a single metre-gauge railway track placed near one truss, a 20-ft. roadway, and two 6-ft. cantilevered footways at

opening between two asymmetrical anchor spans each 344 ft. in overall length. The cantilever areas are only 70 ft. in length instead of 136 ft. in the old bridge, thus reducing the loads on the central piers and enabling the depths of the trusses over those piers to be reduced from 64 ft. to 36 ft. The long shore spans of the same depth facilitated the cantilever erection. High tensile rivets were used throughout the new structure even with mild steel members, so as to guard against errors at site.

With a view to reducing maintenance and corrosion, solid webs are used in all members, suspension links are solid slabs, and all inaccessible surfaces are either lined with gunmetal or metalised, or they are protected with concrete filling.

Stringers and Other Details

Another unusual feature in the design was the stringer system. It consists of separate girders between each pair of cross girders—which are about 32 ft. apart—resting on the tops of the cross girders; the stringers under the railway

assembly is illustrated with the jacking frame and after jacking, described later.

Though the new bridge is designed to carry a 50 per cent heavier live load than the old, its steelwork weighs only 2,060 tons, nearly 600 tons less than that in the old bridge. A 65 per cent increase of allowable stresses, the rearrangement to the trusses, and more economical detailing are mainly responsible for this reduction in weight.

Surat Bridge

The old Surat Bridge consisted of three simple through spans of 80 m., 60 m., and 60 m., carrying only a single metre-gauge track and one cantilevered footway; in the new bridge a 6-m. roadway is included. The same arrangement of spans was retained, but with parallel instead of curved top chords. To accommodate the roadway the piers had to be extended. The longest new span, 262 ft., is almost identical with the Rama VI simple spans, and the two shorter ones have similar panel-lengths and depths. All details and the arrangement of the laterals, sway

frames, stringers and bracings are similar to those employed in the Rama VI Bridge.

Bandara Bridge

The demolished Bandara Bridge had three spans of 80·6 m., 101·2 m., and 80 m. arranged on the cantilever principle. The central suspended span of 131 ft. was hung from 100-ft. cantilever arms. Designed only for a single-line railway and one cantilevered footway, the Japanese-Warren trusses were only 16 ft. 5 in. apart. The railway loading used was equivalent to about 7 units BS loading. The new bridge was built on the same piers but was designed for

the economic panel-length for the deck is short compared with that of the main trusses. Consequently, a sub-panelled truss had to be adopted, the main panel-lengths being 33 ft. and the deck panels 16 ft. 6 in. To guard against the possibility of large secondary stresses in this design of truss, members were made as slender as possible in the vertical plane and the sub-verticals and sub-diagonals are of such lengths that when the bridge is fully loaded the bottom-chord secondary stresses will be at a minimum.

The diamond-pattern top lateral system is used so that it is unaffected by top-chord stresses and it also increases the

and its middle section is built as two shafts joined at the top by a cap carrying an oval-shaped pier. The masonry-faced middle section was so badly damaged that each leg had to be enclosed in a 24-ft. dia. R.C. cylinder 4 in. thick, which eventually rested on the caissons. Each cylinder was cast suspended over its final site in successive sections and lowered 4 ft. 3 in. at a time. The first and later lowest ring section was hung from three plate-link chains suspended from sand-jacks by which it was lowered, and a second ring cast over it.

The cylinder was thus progressively lowered as fresh sections were added



Last phase of erection of Rama VI Bridge: linking suspended span to anchor span

double that loading. Even so its steel-work weighs only 762 tons or 47 tons more than were incorporated in the old bridge. The 16 ft. 5 in. truss spacing is retained.

Here again the cantilever arms were shortened, from 100 ft. to 66 ft., the suspended span being 200 ft. in length. The arrangement of the bearings is unusual, in that the whole superstructure is anchored at one of the reconstructed abutments and is carried on roller bearings over the piers and other abutment, where the maximum expansion movement is $\pm 4\frac{1}{2}$ in. This relieves the piers of longitudinal forces from the superstructure and the vertical bearing reactions are only about 25 per cent greater than previously. A greatly simplified suspension system was thus made possible, a simple pin being used at each end.

For such narrow though long spans,

lateral rigidity of the chord members. The bottom lateral system has double-intersection diagonals, with braking girders in each panel, namely cross-girders added between the stringers. The lateral diagonals and cross members are so attached to the bottom flanges of the stringers as to transfer longitudinal forces. This lateral system shares in live-load chord stresses and is designed to meet them and wind pressures with a maximum increase in normal working stress of 25 per cent.

Reconstruction of Substructure

The demolition of the old spans and reconstruction of the substructure were big and complicated undertakings, but in the view of the authors of the paper, the only really interesting part of Rama VI repair works were those on one of the piers. Like the others, it is founded on a pair of pneumatic caissons

until it came to rest on the caisson, where it was dewatered and plugged with concrete up to low water level. Large cracks in the legs were filled by vibrating this new concrete in which they were embedded. The upper part of the pier was built as two separate legs up to high water level, and the top sections of each cylinder that had been acting as a cofferdam were then cut down to low water level. Above high water level the pier is a single oval in section.

To accommodate the increased width of Surat Bridge all its foundations had to be extended. Moreover, some of the caissons were out of position and out of plumb and one abutment had to be entirely demolished and rebuilt. This and other reconstruction work on the pier foundations was greatly hampered by the presence of anti-scour pitching stone, broken masonry, water-logged

trees and all other manner of debris in a matrix of hard silt.

The order and method of superstructure erection in all three bridges was substantially the same, namely (1) the shore spans on stagings and (2) the other spans by the cantilever method from the shore spans. The superstructures were specially designed for this purpose and the strength of some members was increased to meet the cantilevering stresses. The temporary tie-backs for cantilevering fitted all the bridges, adjustments to suit the slightly different lengths of tie being made in different outstanding lengths of the gussets, to which they were attached by 8½-in. dia. pins. The shore end of the anchor span was loaded with kentledge—17 tons at Rama VI—to counterbalance the uplift induced by the suspended span.

Jacking Frame

When the full length of the latter had been cantilevered out and the last member of each of its trusses had been secured, a jacking frame (illustrated) was attached between the end of the lower chord member and that of the opposing cantilever, which was then immediately above it, as shown in one of the diagrams and one of the photographic illustrations. The screwed rods of the jacking frame were next tightened sufficiently to raise the end of the suspended span very slightly, all rods being equally tensioned.

The jacks were thereupon inserted in the top of each of the frames and lifted the end of the suspended span, the nuts being tightened down on the rods as lifting proceeded. This released the tension in the temporary ties and enabled the permanent pins in the connecting links with the opposing cantilever to be inserted and the load to be transferred to them.

The original intention was for the



View along Bandara Bridge from south abutment looking approximately north, before rebuilding. Note debris and sandbank at south main pier

work to be carried out successively on the three bridges, 53 months being the estimated period for completion. By providing additional plant and staff, however, it was possible to overlap the works slightly and save 12 months in the total time required.

The whole work of reconstruction was under the supervision of Mr. L. V. Yontrakich, Chief Civil Engineer of the Royal State Railways with the advice of Messrs. Sandberg, Consulting Engineers, London.

The designs for the several superstructures were prepared by Messrs.

Freeman, Fox & Partners, consultants to the main contractors, the Cleveland Bridge & Engineering Co. Ltd. Dorman Long & Co. Ltd. co-ordinated the work in Thailand, the demolition of Rama VI and all erection, and Christiani & Nielsen (Thai), Limited, designed and carried out the foundations and the remainder of the demolition.

Acknowledgment is due to the Institution of Civil Engineers for permission to publish the information contained in the paper by Messrs. O. A. Kerenky and K. E. Hyatt, and for courteous assistance in the supply of photographs and drawings.



Completed Bandara Bridge

SPECIAL TRAINS FOR BLACKPOOL ILLUMINATIONS.—The London Midland Region of British Railways has arranged some 600 special day, half-day, and evening excursions to Blackpool for the illuminations this autumn. The trains will run from all parts of the country. A special feature this year is the introduction of weekend tickets from London, Birmingham, Nottingham, Derby, Leicester, Carlisle, and a number of other towns. The busiest day will be September 25 when 76 extra trains will run.

NEW ALPINE ROAD TUNNEL PLANNED.—The Swiss Canton of Grisons is preparing a scheme for a road tunnel, four miles long, under the San Bernardino Pass to afford easier communication with Canton Ticino and thus also Northern Italy. The present road over the pass is kept open during the winter only by the use of powerful snowploughs. Plans have long existed for a railway tunnel under the Splügen or San Bernardino passes to link the Rhaetian Railways with the Swiss Federal or Italian State railways.

German Side-Tipping Wagons

Incorporating high- and low-pitched arrangement of multiple troughs



Low-pitch side-tipping wagon for head loading, capacity 564 cu. ft.

WITHIN the past few years considerable developments have taken place in Europe in the design and construction of side-tipping wagons, not only in sheer capacity of the box type of car, but also in the arrangements and proportions of the box or troughs.

A speciality of this type of wagon has been made by Orenstein-Koppel & Lübecker Maschinenbau G.m.b.H., which, after its postwar re-establishment in Western Germany, was soon making eight-axle tipping wagons of 145 cu. yd. capacity and weighing 240 tons gross. In 1950, however, the prototype of a new design of side-tipping car was built for the Westfälische Landeseisenbahn, which carries a heavy chalk and general rock and earth traffic. This was a four-wheel side-tipping wagon with an arrangement of multiple medium-capacity troughs which could be tipped separately or together.

This proved so satisfactory that the German Federal Railways subsequently placed an initial order for 200 of this type, and later placed further contracts, some of which were for bogie vehicles. The Swedish State Railways also purchased wagons of the same design, and there are numbers on the West German industrial and brown coal railways.

Known on the German Federal Railway as type Ommi, this wagon is intended for bulk minerals, rock, and earths of all kinds, and carries five tipping troughs each of 156 cu. ft. capacity, each of which can be tipped to either side. As the troughs are high-pitched the contents can be tipped into lorries, or low-sided or narrow-gauge wagons alongside, as well as into chutes below the level of the line; and the side dumping range is wide so that the tracks can be kept clear of the discharge.

The troughs are made of high-resistance steel all welded and reinforced with girder and angle sections. A cradle is

fitted to the end walls below the troughs and rests on a cradle support. Two locking bars, one on either side of the troughs, and attached to the wagon frame at their lower ends, hold the troughs in the upright position.

When tipping is to be done the bar on the opposite side is unlocked by disengaging a hook portion, and the trough then tips over by its own weight. Once started, the trough tips right over to a horizontal position, and is then held in that position by a locking device. If there should be any one-sided loading preventing the automatic tipping the locking bar may be used as a starting lever. Another lever reverses the tipping movement after unloading is completed,

and the trough returns to its locked upright position. Only one man is needed to tip and return.

The standard four-wheel Ommi wagon has 39.3-in. dia. wheels and a wheelbase of 15 ft. 4 in., and the length over headstocks is 25 ft. 6 in. Empty weight is 12½ tons and the rated load capacity is 26½ tons, giving a maximum axle load of nearly 20 tons. Overall height with the troughs vertical is 13 ft. 4 in. and the maximum width when upright is 9 ft. 3 in.

The fully-welded St37 steel underframe carries standard buffering and drawgear, and the Hikg Hildebrand-Knorr freight train air brake, with load changeover feature, is normal equipment in Germany. There is clasp rigging with two shoes on each wheel. The overhung laminated springs have eight 4½ in. by ½ in. plates 4 ft. long between eyes. The bogie vehicles mentioned earlier weigh 26½ tons empty and have six low-pitched troughs of 88 cu. ft. capacity each.

Flat Trough Side-Tipping Wagon

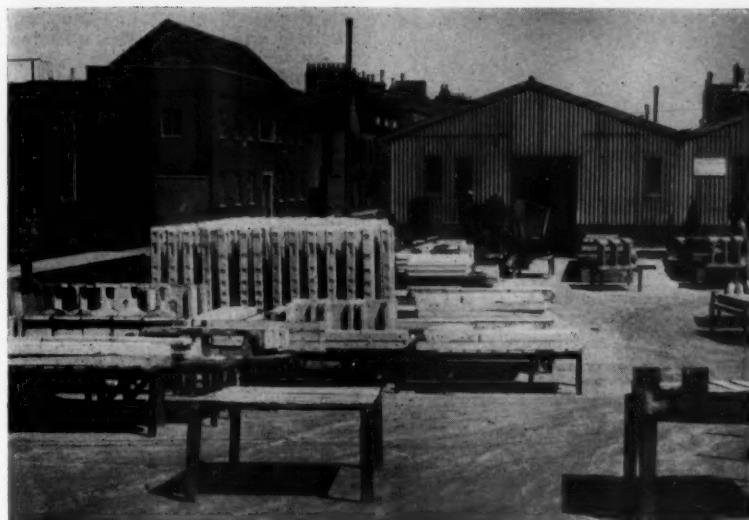
A more recent O. & K. development has been the flat trough side-tipping wagon, designed with very low-pitched troughs and low overall height, about 7 ft. 6 in. in the most recent examples. This wagon is suited to hand loading and the trough side when in the central position is only 5 ft. 3 in. above rail level, whereas the Ommi type is for overhead loading. Loading capacity is reckoned as about 27½ tons on an empty weight of 12½ tons for standard-gauge models.



Five-trough high-pitch side-tipping wagon with total capacity of 775 cu. ft.

Sleeper and Pre-Cast Concrete Depots at Lowestoft

Supply of sleepers to the Eastern Counties and of pre-cast concrete to all parts of the Eastern Region



Concrete depot, with general view of items produced, and men manufacturing drainage channels and posts

MORE than half the total requirements of British Railways, Eastern Region, for permanent way sleepers are supplied by the Lowestoft Sleeper Depot, situated midway between Lowestoft Harbour and Oulton Broad. The area occupied covers some 13 acres and was originally built on a reclaimed mud bank of Lake Lothing, as this waterway to the Broads is known. Today there is a quay 1,000 ft. long which enables ships carrying up to 30,000 sleepers to be discharged directly on to the depot.

In the depot are nearly two miles of standard-gauge track which serves the quay, sleeper stacks, and buildings. This has two connections with the main line to the Eastern Counties and enables rail traffic to be worked in at one end and out at the other end. In addition, there is nearly half-a-mile of 3-ft. gauge track which serves the sleeper boring machines, creosoting cylinders, and charring machines.

Sleepers and crossing timbers are received from the Western seaboard of Canada and of the U.S.A., and from the maritime ports of the South of France and of Corsica.

Stocks Carried

The depot has a storage capacity of 340,000 sleepers, stacked 25 ft. high (say 1,020,000 cu. ft.) and 4,400 loads of crossing timbers (say 220,000 cu. ft.), besides stocks of large timber logs, trees, deals, battens, boards, plywood, and so on.

In addition, stocks are carried of over 1,500 tons cast-iron baseplates for flat-bottom track, 2,000 tons cast-iron

chairs for bullhead track, and 500 tons creosote (or 107,000 gal.), besides many hundreds of tons of rail and chair fastenings, keys, and similar items.

Boring Machines

After six-nine months seasoning, the sleepers are taken to the boring machines where six or eight holes, as required, are bored in the sleepers for the chair and baseplate fastenings and the sleepers are sawn to 8-ft. 6-in. lengths; output is about 1,500 sleepers per nine-hour day.

From the boring machine the sleepers are conveyed on narrow gauge trolleys to the creosoting cylinders. After creosoting, the sleepers are taken to the charring machine.

The wagons usually leave in special trains, say two to three per week, and are despatched anywhere in the East Anglian area or east of a line from London to Peterborough. In a normal year, some 328,000 sleepers are despatched, with 10,600 tons of chairs and baseplates and many tons of small permanent way accessories.

As a side line, there is a large saw-mill capable of cutting trees, logs of timber, etc. This has a capacity of up to 1,500 lineal ft. per day.

Some 60 men are employed in the depot, under the Depot Inspector, who is directly responsible to the Civil Engineer, Eastern Region, Mr. J. I. Campbell.

Pre-cast Concrete Depot

Also at Lowestoft is a pre-cast concrete depot in charge of an Inspector directly responsible to the Civil Engineer. This depot is situated within a few yards of the Lowestoft swing bridge. Covering some 2½ acres, it can turn out 4,500 articles a week. The sand and shingle are stored in an overhead storage bin and feed a large concrete mixer placed in the roof.

The class of article manufactured includes paving stones, drainage units, fence, gate and other types of posts, platform units, bridge units, and concrete piles. Some 12 wagons of concrete articles are despatched every day to all parts of the Eastern Region. The staff numbers 100.



Loading at sleeper depot of sleepers for boring into empties hauled by steam Sentinel 0-4-0 locomotive

New Paris Depot of Wagons-Lits Company

Reception, stocking and manufacture, in the Maison Raoul Dautry, of supplies for restaurant and Pullman cars, hotels, and airport restaurants



Main entrance, with administrative offices, of Maison Raoul Dautry

TO provide for the stocking of restaurant and Pullman cars, and to replenish stocks of itinerant salesmen in trains and those of certain other enterprises, namely the hotels and restaurants at airports which it manages, the Compagnie Internationale des Wagons-Lits has a widespread replenishment organisation, with depots in the principal European capitals.

Paris is the departure point of most of the major European international express trains and is in the centre of a railway network over which many of the company's services operate. It was decided recently to provide more ample facilities than were available on the previous premises occupied since 1919 in a mansion, No. 5, Place des Vosges, in conditions favourable to optimum production and output, in

entirely new premises built for this purpose with the most modern refrigeration and other electrical equipment.

This was the origin of the Maison Raoul Dautry, named after the Deputy-Chairman for 20 years of the company, who was also General Manager of the French State Railway and at a later date a notably successful Minister of Armaments and subsequently, after the last war, of Reconstruction & Planning.

Refrigeration and Cooking Facilities

This new depot must not only furnish fresh meat and vegetables, cooked meats, pastry and so on, but also provide for the baking of bread and the making of ice and ice cream. A very large amount of equipment, therefore has been necessary, particularly in

refrigeration and cooking facilities. The chefs of restaurant and Pullman cars and other employees in the restaurant car service, who previously had to perform tasks requiring considerable dexterity in the restricted dimensions of a train kitchen, can now be supplied with a selection of ready prepared supplies which enable them to perform their tasks with far greater facility.

The location and arrangement of the various sections of the offices, store rooms, kitchens and so on, and the refrigeration and cooking apparatus and lighting provided have been studied with great care. The refrigeration section includes various sub-sections such as those devoted to ice making, freezing of supplies, and so on. There are also certain processes, such as the making of ice cream, which concern both the refrigeration and kitchen sections. The latter includes bakery, pastry, cold cooked meat, and other sub-sections. Stainless steel and plastics play an important part in all fittings.

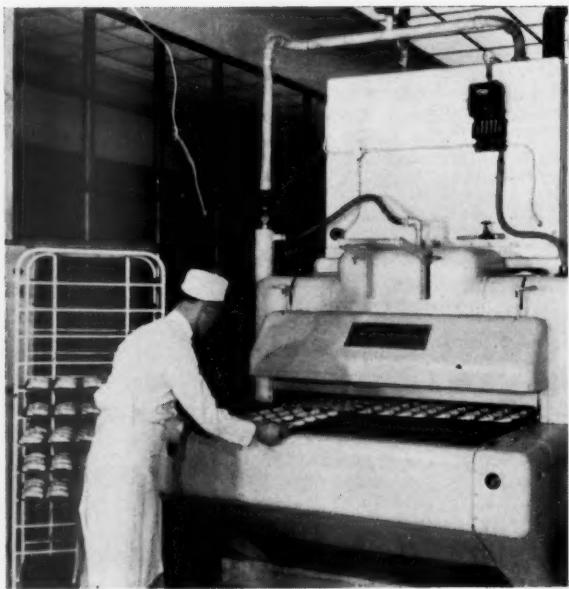
Refreshment Car Menus

Records are kept for the purpose of drawing up refreshment car menus to the varying requirements of chefs, and this information is used in the allocation of supplies to various restaurant car services.

Supplies delivered to the distribution centre arrive through a series of different reception departments for refrigerated goods and so on. Outgoing supplies are moved by road to the stations, depots, or sidings at which refreshment cars are replenished, or to the restaurants and hotels.



(Left) Checking supplies for issue to refreshment cars and restaurants; (right) the bakery



RAILWAY NEWS SECTION

PERSONAL

Mr. H. C. Lusty, General Manager, New Zealand Railways, has been on a visit to Australia, where he attended a conference of Australian and New Zealand Railway Commissioners at Port Augusta, South Australia.

Mr. I. R. Frazer, B.Sc., M.I.C.E., Civil Engineer, Scottish Region, British Railways,

1941, became District Engineer, Perth. In 1945 he was appointed Divisional Engineer, Glasgow, and, in 1947, Engineer (Scotland), L.M.S. Following the inception of British Railways in 1948, Mr. Frazer held the position of Assistant Civil Engineer, Scottish Region, until he assumed that of Civil Engineer, Scottish Region, on January 1, 1952. He was a part-time member of the Committee appointed in 1949 to report on transport in the Glasgow district.

Mr. W. K. Howe, whose death at the age of 86 was recorded in our September 3 issue, was for many years one of the most prominent figures in the American signalling industry. His service with it included a period of exceptionally interesting developments, when the pioneer work of men like Robinson, Hall and Westinghouse was bearing fruit and automatic signalling and power interlocking was finding application on a scale unthought of anywhere else at



Mr. I. R. Frazer
Civil Engineer,
Scottish Region, British Railways, 1952-54



Mr. M. G. Maycock
Appointed Civil Engineer,
Scottish Region, British Railways

who, as recorded in our August 27 issue, retired on August 26, was educated at the Royal High School, Edinburgh, and the University of Edinburgh, where he graduated B.Sc. (Engineering) with special distinction in engineering design. He entered the service of the Caledonian Railway at Edinburgh in January, 1914, and, from 1915 to 1920, he served overseas in H.M. Forces with the Royal Engineers, 52nd Lowland Division, in Gallipoli, and with the Railway Operating Division in Sinai and Palestine. On demobilisation, Mr. Frazer returned to railway service in Edinburgh, and, in 1923, he was transferred to Glasgow as Assistant Engineer in the New Works department of the Divisional Engineer, L.M.S. In 1926, he became senior Assistant Engineer, South Western District, L.M.S., in Scotland. In 1934, Mr. Frazer was appointed Assistant to the District Engineer, Derby (South), and Acting District Engineer in 1939. He returned to Scotland in the following year as District Engineer, Inverness, and, in

Mr. M. G. Maycock, B.Sc.(Eng.), M.I.C.E., Assistant Civil Engineer, Scottish Region, British Railways, who, as recorded in our August 27 issue, has been appointed Civil Engineer, Scottish Region, as from August 26, was educated at Stonyhurst College, and graduated B.Sc. (Engineering) at the University of London. He entered the service of the North Eastern Railway in the department of the Civil Engineer at York in 1915, and, following service in a number of districts and in various headquarters sections, was appointed Permanent Way Assistant, York, L.N.E.R., in 1937, subsequently assuming charge of the New Works Section there. Mr. Maycock became Assistant District Engineer at Darlington in 1939; Assistant Engineer (Maintenance), York, in 1943; Assistant Engineer, Scottish Area, L.N.E.R., Edinburgh, in 1945, and District Engineer, London, Kings Cross, L.N.E.R., in 1948. In 1952, he was appointed Assistant Civil Engineer, Scottish Region, British Railways, from which position he now takes over as Civil Engineer.

that time. At first occupied with telecommunications Mr. Howe joined the undertaking founded by J. D. Taylor, one of the first in America to interest himself effectively in all-electric power working and the originator of the idea of the "dynamic" return indication which met with much favour on certain railways. The Taylor type of equipment, modified by experience, was applied in many large installations and found its way to other countries, including Great Britain. Mr. Howe was the designer of an electric signal machine, great numbers of which were produced and are still in service. During a career of 45 years he exercised a far-reaching influence on signalling progress.

Mr. J. R. S. Halford has been appointed Export Sales Manager of I.T.D. Limited.

Mr. E. M. Jubb, B.Sc., has been awarded the Aluminium Development Association Research Scholarship in the use of light alloys in structural engineering, for 1954.

**Mr. Leslie M. Sayers**

Appointed Divisional Operating Superintendent, Crewe, L.M. Region

Mr. Leslie M. Sayers, District Operating Superintendent, Nottingham, London Midland Region, British Railways, who, as recorded in our August 13 issue, has been appointed Divisional Operating Superintendent at Crewe, began his railway career on the former L.M.S. Railway at Belper in 1927. From 1932 to 1935 he was Assistant District Signallers Inspector, Lancaster Castle and Heaton Norris. He was subsequently appointed Assistant District Controller Peterborough (1935); Head Office Inspector (Freight Services), Derby, early in 1936; Assistant Station Master & Goods Agent, Heysham Harbour, (later in the same year); Stationmaster, Lancaster Castle (1940); and Head Office Inspector (Passenger Services), Crewe (1941). In 1942 Mr. Sayers was Acting Head Office Inspector, Chief Operating Manager's Office, Watford; Assistant Divisional Controller (Freight Services) Derby in 1944; District Controller, Peterborough, in 1945; Assistant District Operating Manager, Leicester, in 1946, and District Operating Superintendent, Liverpool C.L.C., 1948. He became District Operating Superintendent, Hull, in March, 1950, and, in August, 1951, District Operating Superintendent, Nottingham, from which position he now moves to Crewe. Mr. L. M. Sayers succeeds Mr. H. F. Palant, who has unfortunately had to relinquish his railway duties temporarily owing to ill health.

We regret to record the death on August 31, at the age of 74, of Sir John Macfarlane Kennedy, O.B.E., M.I.C.E., M.I.E.E., formerly Chairman of the Electricity Commissioners. Sir John Kennedy, who received technical training at Zurich and Cambridge, became a partner in the firm of Kennedy & Donkin, Consulting Engineers, in 1908, remaining with the firm until 1934. For many years he was engaged in electricity supply distribution and traction work both in Britain and abroad, and among other work he was responsible for the first electrification of the London County Council tramways, the Hammersmith & City Railway, and the western and eastern sections of the Southern Railway. In 1922, he submitted to the Electricity Commissioners proposals for the reorganisation of electricity supply in Britain, and later he

prepared a report on the same subject for the Ministry of Transport. For many years Sir John Kennedy was associated with the Institution of Electrical Engineers, having been elected a member in 1914. He was a Member of Council from 1928 to 1931, a Vice-President from 1931 to 1934, and, in 1935, he became President. He was also a Past-President of the Association of Supervising Electrical Engineers.

Mr. S. T. Willcox, Plant Assistant, Mechanical & Electrical Engineer's Department, Brighton H.Q., Southern Region, British Railways, has been appointed Outdoor Machinery Assistant, Mechanical & Electrical Engineer's Department, Brighton, with effect from September 1, 1954.

We regret to record the death on August 26, at the age of 86, of Mr. Edward Sutton, Stores Superintendent, Metropolitan Railway, from 1913 until his retirement in 1933. Before his appointment to the Metropolitan Railway Mr. Sutton was for many years employed in the Stores Department of the Great Northern Railway at Doncaster.

Mr. G. E. Beharrell, Managing Director of the Dunlop Rubber Co. Ltd., is at present on a visit to the Dunlop factories in Buffalo and Toronto.

The following executive changes have been announced by A. C. F. Industries Inc.:—

Mr. Charles J. Hardy, Jr., President, has been elected Chairman of the board, succeeding Mr. John E. Rovensky. Mr. James F. Clark, Vice-President in charge of Finance, succeeds Mr. Hardy, Jr., as President.

Mr. John P. Richmond, Comptroller, has been elected Vice-President in charge of Finance, Mr. Walter J. Conaty succeeding him as Comptroller.

Mr. Paul M. Anderson, Assistant Comptroller, becomes Assistant Vice-President. Messrs. Frank F. Cleminshaw and John W. Hubbard, become Assistant Comptrollers.

Mr. David Ohler has been appointed an assistant treasurer.

The first term of office of the Transport Users Consultative Committee for the South Eastern Area of England having expired, the Minister of Transport & Civil Aviation has appointed the undermentioned persons to be members of the Committee for the South Eastern Area until June 18, 1957.

Chairman:—Mr. M. H. Pugh.

Members:—

Messrs. L. G. Mizen, G. E. Cumming, C. T. Miller (representing Agriculture).

Messrs. R. J. Davie, W. G. Crowhurst, Lt.-Colonel C. W. Brannon, M.C., T.D., D.L., J.P. (representing Commerce and Industry).

Mr. A. Dudley (representing Shipping).

Messrs. J. E. Brown, G. H. Parks (representing Labour).

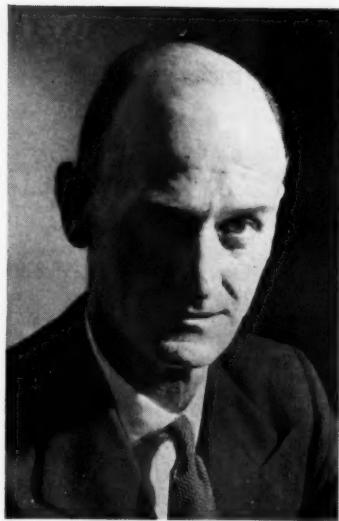
Councillor Colonel the Rt. Hon. the Lord Basing, T.D., Councillor C. H. R. Skipper, J.P., Councillor H. P. E. Mears, C.B.E., J.P., Alderman G. M. Radwell (representing Local Authorities).

Messrs. W. H. F. Mepsted, A. J. Wright, M.B.E., J.P. (representing the British Transport Commission).

Additional appointments: Mrs. D. Young, Lt.-Colonel Sir Mervyn Wheatley, K.B.E.

Secretary:—Mr. C. W. G. Elliffl.

The office of the Committee is at 84, Tooley Street, London, S.E.1.

**Mr. Alexander McDonald**

Appointed Secretary, Institution of Civil Engineers

Mr. Alexander McDonald, B.Sc., M.I.C.E., who, as recorded in our September 3 issue, has been appointed Secretary of the Institution of Civil Engineers, graduated in the University of Edinburgh in 1923. He subsequently received two years' practical engineering training in Britain before joining the engineering staff of the Public Works Department of Nigeria. He was appointed Senior Executive Engineer in 1937, and later became Inspector-General of Works. His retirement from that position concluded nearly 30 years of service in West Africa, of which more than 25 years were spent in Nigeria. Mr. McDonald has had wide experience in civil engineering, and he has made a study of highway engineering in the United States. The Conferences on Civil Engineering Problems in the Colonies owe much to his original suggestion that the activities of Colonial engineers should receive more prominence in the affairs of the Institution, and his keenness to further the interests of the latter is reflected in the formation of the West African Joint Branch of the Institution of Civil Engineers, the Institution of Mechanical Engineers, and the Institution of Electrical Engineers, of which he is the first Chairman.

Mr. J. S. Langlands, Managing Director of the British General Electric Company (Canadian) Limited, has been appointed Assistant Manager for Scotland, General Electric Co. Ltd. Mr. Langlands was Vice-President of the Canadian Association of British Manufacturers and Agencies.

Mr. J. N. Dean, son of one of the founders of Dean & Dawson Limited, celebrated his golden wedding on August 25. Mr. Dean was a member of the board from 1904 until 1948 and became Chairman in 1931, one year before the death of his father, Mr. Joseph Dean. Dean & Dawson Limited was a subsidiary of the L.N.E.R. until nationalisation in 1948.

Mr. R. S. Jones, M.I.E.E., Manager, Plant Sales Department, British Thomson-Houston Co. Ltd. is retiring after forty-one years of service with the company. He has been succeeded by Mr. R. M. Grant, B.Sc., M.I.E.E., Assistant Manager, Plant Sales Department.

Ministry of Transport Accident Report

North Queensferry Tunnel, March 7, 1954: British Railways, Scottish Region

Brigadier C. A. Langley, Inspecting Officer of Railways, Ministry of Transport & Civil Aviation, inquired into the accident which occurred at about 10.50 p.m. on March 7, 1954, at the entrance to the North Queensferry Tunnel, near the Forth Bridge, when the 6.55 p.m. up express, Aberdeen to King's Cross, consisting of 13 bogie coaches hauled by Class A-4, 4-6-2 engine No. 60024 was climbing the 1 in 70 gradient from Inverkeithing and the engine began to slip in the tunnel. It stopped momentarily about 300 yd. from the entrance and ran back; the last three vehicles were derailed at the catch points just outside the tunnel. The last was forced across the down main, blocking both lines, the next canted on its side and the next to that was derailed in the catch siding. The buckeye couplings remaining connected undoubtedly saved the two last named from being precipitated down an embankment. Only one passenger was slightly injured.

The signalman at Forth Bridge North, noticing the train to be a long time in section, had stopped all traffic before the fireman telephoned from an intermediate block signal. Assistance was obtained promptly. Single line working was introduced at 11.25 next morning and by 4.00 normal working had been restored. It was fine with a strong westerly wind.

The Engine

The engine, built in 1936, had run 6,500 miles since the last general repair. It had a tractive effort of 35,455 lb. at 85 per cent of the boiler pressure of 250 lb. and a total weight of nearly 168 tons, 66 tons on the coupled wheels, adhesion factor 4.18. There are two independent sets of sanders, the dry delivering through 1½ in. pipes on each side to the leading coupled wheels, with fluted spindle valves worked by a lever in the cab and double-wire mechanism. Each sand box takes six buckets, sufficient for continuous use for 1½ hr. with the valve fully open. The wet steam sanders are of usual type, projecting sand forcibly between the middle coupled wheels and the rail. There is no back sanding for either engine or tender. The sanders are not usually operated simultaneously; there is little to choose between them and some drivers prefer the dry, others the wet. The driver is on the left and as he sits has all controls within easy reach.

Location and Derailment Marks

Except for a short level length the line rises continuously at 1 in 70 from Inverkeithing for over two miles to the bridge with two tunnels, Inverkeithing, 386 yd., and North Queensferry, 569 yd., about half a mile from the bridge. There are track circuits throughout and intermediate signals, with catch points at ½ mile from Inverkeithing and again just outside the Queensferry tunnel. These latter are of the usual self-acting, double switch type, with a 103 ft. catch siding and buffers on the edge of the 40 ft. embankment. The tunnel is comparatively dry, though water leaks in at several places. With nearly 100 trains daily it is constantly being filled with steam and smoke. The up line had been relaid on the day of the accident with 95 lb. b.h.

rail on ash ballast, extending through the catch points and the tunnel for 640 yd., with 20 m.p.h. speed restriction, "C" and "T" boards and weekly announcement.

There were no burns on the new rails indicative of heavy slipping nor signs of sand on their tops, or on sleepers or ballast, but ashes from the relaying work made it difficult to distinguish the presence of sand. The switch blades were undamaged though there was a slight mark on the stock rail edge of the right-hand blade and both stretchers were bent. The marks of derailment here and the positions in which the derailed vehicles came to rest, together with the damage to the track, etc., and certain evidence tendered to him, led Brigadier Langley to regard it as likely that the second of the two skid marks, 295 yd. from the tunnel mouth, fixed the furthest point reached by the train which, he thought, stopped either as the last pair of wheels were over the catch points or shortly after they had passed through them. In either case the blades failed to close fully, remaining probably about ½ in. open. When the train began to move back, wheels became derailed there and the rear coach veered towards the up line instead of following the siding and hitting the buffer stops a glancing blow, was thrown further across the main lines.

Evidence

The driver said he was satisfied with the engine's condition and performance and not worried because the load was 17 tons over the maximum of 450. It was steaming well and he had 21 in. of vacuum in the reservoir. He used sand when starting on two occasions and passed Inverkeithing under clear-signals at about 20 m.p.h. and opened the regulator fully at 25 per cent cut off. He applied dry sand on entering the first tunnel and continued for the rest of the climb. Speed increased a little and then fell gradually but he did not alter the cut off, passed the intermediate signals, etc., and approached the Queensferry tunnel at 25 m.p.h. with speed dropping. On entering it the wheels began to pick up so he partially closed the regulator and set the reverser at 30 per cent but this was not effective and he had to close and re-open the regulator constantly to check slipping, which went on practically the whole time. Speed continued to drop but he did not realise they had stopped and were running back until he felt a bang. He thought the rear coach had hit the siding buffer stops, closed the regulator, applied the brake and turned off the sanders. The fireman went to find out what had happened. The tunnel was full of smoke and he had no indication of the direction of running; he could neither see nor touch its side.

With a relief engine coupled in front the train proceeded with the 10 undamaged coaches but with dry sand and cylinder cocks open the engine slipped a little on starting. At Haymarket shed the driver checked the dry sanders and found them working satisfactorily. The lever, however, was stiff; he had to pull with both hands to open fully and was confident he had done that on all occasions. He preferred dry to wet sanding, particularly in tunnels. He had come to a stop before

in a tunnel from slipping but had never run backwards. Engines were apt to slip more easily on new than old rails.

The fireman generally confirmed this evidence and did not notice they were running back. Independent evidence showed the dry sanders to have been working properly before the engine left Dundee and on its return to shed.

The guard said he realised in the tunnel that the engine was slipping. He reached to try to feel the wall but finding his van was in the open went to apply the brake but was thrown across the vehicle. A sleeping car attendant did not realise that the train had stopped and was running back; he noticed nothing unusual until the derailment.

The driver of the relief engine came back on the wrong line using dry sand and leaving a sanded rail for his return and after coupling up had no difficulty in starting. Earlier that day on a B Class engine with five coaches he had no difficulty until the tunnel and reduced speed to the 20 m.p.h. restriction; he found his wheels slipped on the new rails but with dry sand managed to get through. He had experienced similar difficulties before on new rails on gradients.

Testing of Catch Points

The ganger said he tested the catch points after relaying was completed. They operated satisfactorily although they gaped a little when let back slowly. He cleaned and oiled the chairs and they closed fully.

The chief permanent way inspector examined them after the accident and concluded that the train was running through them so slowly that the spring had not driven the blades home against the stock rail. When the train ran back the leading wheel flanges caught between stock rails and blades and became derailed. The points probably received a jerk causing the switches to close sufficiently to send the other wheels into the siding. Tested after the stretcher bars had been straightened the points worked properly. Trains tended to slip more easily on new rails than on worn ones. It was normal for new rails to be worn bright over a small width until they had been run in.

The Assistant District Motive Power Superintendent was surprised to see only a narrow line of contact on the outer rail edges, only ½ in. in places, and found no conclusive evidence of slipping except at a point 295 yd. from the points, but there were no signs of burning and nothing to suggest that all six coupled wheels had been spinning there. The train being 303 yd. long these marks were made just when the rear bogie was over the points, though there was no definite evidence that the train had actually stopped at this point. He was not prepared to say no sand had been used, although he would have expected to see more traces if it had been applied full bore. He found the points, closed slowly, remained open 1 in., but the stretchers had not then been straightened.

Since January 1, 1952, three passenger, one fish and 26 freight trains have failed to negotiate this incline at various places, 12 in this particular tunnel. Except in one case an assisting engine was sent. One of the passenger trains was this 6.55 p.m. from Aberdeen. On every Sunday since

the beginning of this year the load has been up to or in excess of the authorised maximum; the heaviest was 474 tons on February 7.

Inspecting Officer's Conclusions

Brigadier Langley is satisfied that the engine was steaming well with brakes and sanding gear working properly. In normal circumstances little difficulty should be experienced but load was slightly over authorised maximum and speed had been reduced to the 20 m.p.h. restriction over the new rails, more liable than worn ones to cause slipping. The strong cross wind would have slightly increased the train resistance round the long 40 ch. curve which begins on an embankment 1,433 yd. from the tunnel, on entering which the engine probably was labouring and inside began slipping intermittently. Speed dropped until the train stopped and began running backwards. In the circumstances the driver cannot be blamed for mis-handling the engine or failing to notice the run-back. It is well nigh impossible to sense direction of movement from the footplate at low speed in an unlighted tunnel full of smoke and steam. The guard could take no action in time when he realised the situation.

Remarks

The incline, mostly on curve, is undoubtedly a difficult one and occasional failures may be expected, but in view of the number which have occurred it seems desirable to review engine loadings to ensure they are not too heavy, taking everything into consideration. The loading of this train warrants particular examination in relation to the class of engine which may be expected to work it, seeing the number of times the loading has exceeded authorised maximum.

Various accidents due to trains running back unbeknown to the driver, have occurred as at King's Cross, February 4, 1945, and Glasgow (Queen Street), October 12, 1928. Lights have been provided in those tunnels and in others on steep inclines. Provided they are spaced sufficiently closely they can be of great assistance at critical times. A scheme is being prepared for the Inverkeithing and North Queensferry tunnels and Brigadier Langley recommends that conditions in others on heavily worked inclines be also reviewed and lights provided where warranted.

The catch points were so close to the tunnel that any run-back would result almost inevitably in derailment at the buffer stops; the guard would have little or no opportunity to make an emergency brake application before hitting them. They were placed there to give sufficient overlap beyond the intermediate block home signal but in the conditions obtaining this can be reduced considerably. There is a much better site near the other end of the 40 ft. embankment for a longer siding with substantial sand drag, thus providing an efficient retarder and time for a guard to act. A scheme is being prepared and it is hoped the work will be undertaken without delay.

LONG ISLAND TRAFFIC DISRUPTED BY STORM.—Traffic on the Long Island Rail Road was affected by a hurricane which swept the New England seaboard on August 31. Trains were immobilised either by lack of electric power or by fallen trees across the lines.

Swiss International Train Services in 1954

Acceleration and improvement of through services between Switzerland and both Germany and France

As in other European countries, substantial improvements have taken place during the present year in the train services between Switzerland and neighbouring countries, Germany and France in particular. The services concerned have been greatly accelerated, not only by faster running times but also by curtailing the time previously spent in frontier formalities, some of which now are conducted in the trains instead of at the frontier stations.

One of the foregoing is the service between Geneva, Berne, Zurich, St. Gall, and Munich, via Rorschach, Bregenz, Lindau, and Kempten. Previously through coaches were run in each direction over this route, but there are now two complete through trains each way between Geneva and Munich.

These are composed entirely of standard Swiss lightweight stock, which never previously has run across the German frontier on any regular service; only the Swiss restaurant car cannot run through, as the electric cooking in these cars depends on collection of current by a pantograph from the overhead supply, which is not available on the German portion of the route. In Germany, therefore, the Swiss car is replaced by a German buffet car.

Geneva-Munich Through Train

Previously there were through coaches from Berne to Munich on the 6.55 a.m. train, leaving Zurich at 9.17 a.m. and reaching Munich at 4.45 p.m. Now the 6.25 a.m. from Geneva has become a through train to Munich, leaving Berne at 8.24 a.m. and Zurich at 10.23 a.m., and reaching Munich at 4.12 p.m., an acceleration in the through service of 2 hr. 24 min. from Geneva, 1 hr. 58 min. from Berne, and 1 hr. 39 min. from Zurich to Munich.

In the afternoon, the 12.36 p.m. from Geneva runs through to Munich, leaving Berne at 2.22 p.m. and Zurich at 4.4 p.m., and reaching Munich at 10.15 p.m.; from Rorschach onwards this service is new.

The return trains are at 8 a.m. and 1.30 p.m. from Munich. The morning service is 1 hr. 30 min. faster from Munich to Geneva than before, and the afternoon service again is new. In the 1954 Swiss train-naming scheme, the morning trains in each direction are called the "Bavaria," and the afternoon trains the "Rhone-Izar."

Schaffhausen Route

A second greatly improved service is between Zurich and Stuttgart via Schaffhausen and Singen; for this, as a kind of balance working, new German lightweight stock is used; the coaches are 86 ft. 7 in. in length, the longest in Europe. There are three services in each direction daily, taking from 4 hr. 1 min. to 4 hr. 10 min. (except one southbound service taking 4 hr. 19 min.). Similar trains ran previously, but with ordinary coaching stock, and taking from 22 to 40 min. (average 30 min.) longer. Each of these trains is second and third class only with restaurant car service.

Diesel Working over Electrified Lines

Another important Swiss-German service, the "Helvetia," though not altered in time on the Swiss side of the frontier, has been greatly improved on the German

side by being routed through Bebra instead of through Kassel; leaving Zurich at 7.39 a.m., this train now reaches Hamburg at 6.43 p.m., 60 min. earlier; in the reverse direction departure from Hamburg is now at 12.45 p.m., 43 min. later, but arrival in Zurich at 11.51 p.m. is unchanged. This train is of particular interest in that it is one of the German three-car diesel-electric streamline units, which works through over the electrified Swiss line between Basle and Zurich with diesel-electric power and a German driver in charge throughout.

New Services via Delle

With France, the chief improvement has been introduction of new trains of Swiss lightweight stock between Berne and Belfort, there connecting with the French high speed 7.45 a.m. Paris-Basle and 6.25 p.m. Basle-Paris services. Eastbound, the train leaves Belfort at 12.16 p.m., 6 min. after the arrival of the 7.45 a.m. from Paris, cuts the frontier stops at Delle and Porrentruy to 7 and 3 min. respectively, and reaches Berne at 2.30 p.m., 1 hr. 30 min. earlier than the previous connection via Basle; on the return journey the departure from Berne is at 5.15 p.m., 2 hr. 4 min. later than via Basle, for an arrival in Paris at 11.55 p.m. The Swiss trains between Belfort and Berne have now received the name of "Ambassadeur."

Paris—Geneva via Vallorbe

Another Swiss-French service, that between Geneva, Lausanne, and Dijon, in connection with the French Nos. 15 and 16 high-speed non-stop trains between Dijon and Paris, has been greatly improved by the introduction of a twin-unit diesel-electric set of the French National Railways, in place of the single car previously used.

Two types of motorcoach are used, one diesel-mechanical containing 48 seats and the other diesel-hydraulic with 56 seats, and one or other is coupled to a 56-seat trailer with buffet facilities; the units are second class only. Since their introduction, they have run through to and from Geneva, instead of, as previously, to and from Lausanne only, when a Swiss electric train made the Geneva connection.

Leaving Geneva at 7.23 a.m. and Lausanne at 8.8 a.m., the railcar set reaches Dijon at 10.48 a.m., and through passengers arrive in Paris at 1.34 p.m.; at Lausanne this train has an excellent connection from Berne at 6.44 a.m., which gives a Berne-Paris time of 6 hr. 50 min., very nearly as fast as the new accelerated time via Belfort.

The return journey eastbound is in connection with the 6.25 p.m. from Paris; departure from Dijon of the railcar is at 9.7 p.m., Lausanne being reached at 12.2 a.m. and Geneva at 12.50 p.m. In the new Swiss train-naming scheme, the Geneva-Dijon service has received the name "Paris-Eclair."

The times of all the services mentioned are considerably faster than any that operated before the war, and the acceleration made possible by friendly international co-operation in the cutting of tiresome frontier halts is of the greatest value to through travellers, and to businessmen in particular in the light of air and road competition.

Permanent Way Institution Visit to Ciment Fondu Works

Sixty members of the Permanent Way Institution recently visited the West Thurrock Works of Lafarge Aluminous Cement Co. Ltd., manufacturers of Ciment Fondu high alumina cement; the trip was arranged by Mr. J. A. R. Turner, Secretary of the Institution. The party went by launch down the Thames.

On arrival at West Thurrock the visitors were taken to the works in a special train on the works railway system. In the laboratories they were shown some of the chemical and physical control exercised at all stages of manufacture to ensure that the finished Ciment Fondu complies with the standard specification. Technical service and research work are also carried out in the laboratories. In the works wash-houses the party washed at imitation marble fountains, which are Ciment Fondu products.

Raw Materials of Aluminous Cement

The principal raw materials concerned in the manufacture of aluminous cement are bauxite and limestone and, to fire the furnaces, coal is used in its pulverised form. Though the limestone is available in this country, bauxite has to be imported.

Crude bauxite, which arrives as a mixture of large pieces and fine material, is subjected to a crushing and screening process which produces prepared "lumps" and "fines." The lumps which range in size from 1 to 5 in., are suitable for charging direct to the furnaces, but the fines, ranging from $\frac{1}{2}$ in. down to dust, have to be mixed with small quantities of cement and water and processed into briquettes before they can be charged to the furnaces.

Limestone is delivered in prepared lumps; so no processing is required. Dry cleaned small coal is used and, after being pulverised in a central grinding plant, is fed pneumatically to the furnaces for firing.

All these raw materials and the intermediate products are stored in a single storage shed. This building is served by a high-speed 12-ton electric overhead travelling crane, capable of handling materials at the rate of over 200 tons an hour.

The prepared materials are fed to an automatic weighing plant which discharges them into a skip of an automatic trolley

serving the furnaces. The molten material is solidified, cooled in a rotary cooler, and broken down into small pieces.

Grinding

Grinding the clinker into Ciment Fondu is done in rotating combination tube mills. Each compartment is charged with steel balls which, by their tumbling action as the mill rotates, crush the clinker down to the fine powder known as aluminous cement. Because of the extreme hardness of the clinker, the wear and tear and consumption of grinding media is very much greater than with Portland cement.

After the trip around the works, visitors saw a fully loaded lorry drive over a 7-in. thick Ciment Fondu concrete roadway laid only that morning, 7 hr. before.

Mr. C. C. Moore, Works Manager, took the opportunity to tell the guests how much he appreciated the interest that had been shown. He emphasised how the Lafarge works place importance on efficiency and cleanliness of operation.

French Winter Passenger Services

The few alterations embodied in the French National Railways winter passenger services in force from October 3 are mainly confined to diesel services.

In the Northern Region, the "Paris-Ruhr" diesel train from Dortmund to Paris will call additionally at Compiègne but will arrive in Paris at 12.45 p.m. as before, the 96 miles from St. Quentin to Paris being covered in 80 min. including the new stop.

The fast cross-country diesel service between Lyons and Strasbourg will be worked by the new long distance units (R.G.P., "rames de grand parcours"), with a supplementary charge, as will the Bordeaux-Toulouse services. These will also work the Paris-Clermont Ferrand-St. Etienne diesel services, which are being extended to Lyons; at Lyons Perrache the Lyons-St. Etienne to Paris diesel will connect with the southbound "Mistral," so giving an improved day service from Paris to St. Etienne via Lyons.

A new diesel railcar service is being provided between Limoges and La Rochelle; this hitherto has been a summer service. Delivery of new railcars allows of replacement of steam by diesel services

in the South Eastern Region, notably between Lyons and Vichy, Grenoble and Chambéry, and Nice and Breil, the last being over part of the prewar international route from Nice to Turin via the Col di Tenda, wrecked during the war and not since reopened for through traffic.

The 6.10 p.m. evening train from Paris Montparnasse to Nantes, electrically hauled between Paris and Le Mans, starts 15 min. later and is accelerated by 21 min. to Nantes. It is at present allowed 118 min. for the 131 miles non-stop from Paris to Le Mans, and the acceleration is stated to be over the steam-hauled portion of the journey.

The schedules over the Savoy lines of the South Eastern Region, now in course of electrification, are being cut by some 5 min. between Culoz and Bellegarde, on completion of the work, but correspondingly increased between Bellegarde and Geneva.

Services via Calais

As regards Anglo-French services by the Short Sea route, the 2.42 p.m. boat express from Calais Maritime to Paris Nord in connection with the morning service from Victoria will stop additionally at Boulogne Tintilleries. It is at present allowed 207 min. from Calais to Paris, and is a heavy train, including the Calais-Riviera vehicles of the "Blue Train," and the through vehicles to Rome of the "Rome Express" and to Trieste of the "Simplon-Orient Express." The through coach from Calais to St. Gervais (for Chamonix) in the evening train connecting with the afternoon service via Folkestone/Calais is being discontinued.

Staff & Labour Matters

Railway Wages

Further meetings between Sir Brian Robertson, Chairman of the British Transport Commission, and leaders of the N.U.R. and T.S.S.A. took place on September 8, separate meetings being held with the representatives of either union.

The decision of the N.U.R. to meet Sir Brian Robertson again, came after a recommendation of the N.U.R. negotiating committee, which had been asked by that union's executive to consider three proposals: (a) that negotiations should be resumed as suggested by the Chairman of the Commission; (b) that the N.U.R. should approach the Minister of Transport, Mr. John Boyd-Carpenter, with a view to securing financial help for the Commission so that the wages increases which were being sought could be granted; and (c) the calling of a special delegate conference of the union to consider strike action.

A statement issued by the N.U.R. after its meeting on August 31 had said that after very serious consideration and prolonged debate it had been decided to make an immediate approach to Sir Brian Robertson. The statement continued: "It is our considered view that Sir Brian Robertson's proposals to re-examine the whole situation without commitment to either side is too vague and does not provide a satisfactory basis for further negotiations. We recommend that he be told of this and that an early meeting be arranged for this purpose."

Mr. J. S. Campbell, the General Secretary of the N.U.R. has been attending the General Council of the T.U.C. at Brighton this week and the meeting arranged with



Members of the Permanent Way Institution and staff of Lafarge Aluminous Cement Co. Ltd. at the Ciment Fondu works at West Thurrock

the Chairman of the Commission necessitated his return from Brighton.

Strike Threat

Meanwhile, in the Manchester area feeling is still running high at the delay in granting a substantial increase in pay. At a meeting in Manchester on September 5, members of the N.U.R. voted unanimously for a resolution urging a national strike if the Commission did not immediately offer a big increase in wages. Earlier, delegates representing 24,000 members of the N.U.R. in the North-West had approved the resolution and they also endorsed the action of the union executive in rejecting the B.T.C. offer.

Contracts & Tenders

Australian General Electric Pty. Limited, in association with the Metropolitan-Vickers Electrical Co. Ltd. will supply 80 sets of traction motors and control equipment for multiple-unit stock for the New South Wales Railways (Sydney suburban and Sydney-Lithgow services). The order is valued at more than £1,000,000. The equipment will be manufactured partly by Metropolitan-Vickers at Manchester and partly at the A.G.E. works at Auburn, New South Wales.

The Gloucester Railway Carriage & Wagon Co. Ltd. is to supply four 30-ton bogie ballast wagons to the London Transport Executive.

S.A. La Bruggeoise et Nicaise & Delcave, Belgium, has received from the Belgian National Railways an order for 22 twin-car 3,000-volt d.c. electric trains, to be constructed at the Bruges works on the Budd stainless steel Shotweld system.

Société Métallurgique d'Enghien-St. Eloi, Belgium, has received from the Royal Hashemite Kingdom of Jordan an order for rolling stock for the Hedjaz Railway.

British Railways, North Eastern Region, have placed the following orders:

Quasi-Arc Co. Ltd., Bilston: welding equipment, Shildon Wagon Works
S. & S. Sykes, Golcar: renewal of signalbox, Linthwaite

Thermic Equipment & Engineering Co. Ltd., white metalling plant, Darlington Locomotive Works

Albert Innes Limited, supply and erection of electrical installation, Ardsley Motive Power Depot

The United Kingdom Trade Commissioner at Brisbane has reported that the closing date of the call for tenders for sheep vans, refrigerator vans and louvred vans issued by the Queensland Government Railways has been postponed until October 18. In addition an alternative tender is now required for the manufacture, supply and delivery of 50 CMIS refrigerator wagons as well as the 25 originally mentioned.

Details of the tender appeared in our September 3 issue.

According to the Special Register Information Service of the Export Services Branch, Board of Trade, the Uruguayan Railways invite tenders for six complete sets of diamond crossings with two double slips, each composed of the following:

Two end frogs with their two corresponding counter-rails. Four sets of two common point blades with stock rails. Two sets of knuckle-railed frogs of the type with movable points, with their four corresponding special blades, and all other accessories and special parts to complete the crossings with the exception of

sleepers. The sets are to be grouped in accordance with the drawing attached to the tender documents.

The issuing authority is the Administración de Ferrocarriles del Estado, Departamento de Proveeduría, Montevideo. (Specification No. CM 47/54), and the closing date for tenders is October 8.

A copy of the tender documents (in Spanish), including specifications, drawing, and conditions of tender may be obtained on loan by United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.2).

Local representation is essential. The Export Services Branch will supply, on request, the names of firms which have expressed willingness to act on behalf of United Kingdom firms.

The Director-General of Supplies & Disposals, New Delhi, is inviting tenders for the following:

- (a) 29 sets dip lorries, suitable for metre gauge, capacity 15 tons, with ball bearing and cast steel wheels (two lots of 16 and 13 sets)
- (b) 1000 water cocks (various) for coaches
- (c) 320 units (complete assembly) side buffers 20 in. ton (b.g.)
- (d) 96 sets Ebl. buffers cylindrical with 18 in. dia. faced plungers
- (e) 240 buffer casing outside

Tenders are to be submitted to the Director-General of Industries & Supplies, quoting references: for (a) SRI/16312-E/1; (b) SRI/16684-E/1; (c) SRI/2538-E/III; (d) SRI/16346-E/III; (e) SRI/16683-E/III. They will be received up to 10 a.m. on (a) September 24; (b) September 27; (c) October 5; (d) October 6; (e) October 14.

Forms of tenders are only available for purchase in India from the Deputy Director-General (Supplies), Directorate General of Supplies & Disposals, New Delhi; Director of Supplies & Disposals, Bombay or Calcutta; Deputy Director of Supplies & Disposals, Madras.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Store Department, 32-44, Edgware Road, W.2, on application to the "CDN" Branch. The drawings can be seen at the offices of Hodges Bennett & Company, 59-60, Petty France, London, S.W.1, from whom copies may be obtained at a fixed price per sheet.

REVISED BRITISH STANDARD FOR CARBON BRUSHES.—A revised standard, B.S. 96: 1954, has been issued for parallel-sided carbon brushes for commutation and slip ring machines. The standard applies to carbon, graphite, and metal-graphite brushes, with the exception of those used in aircraft. The various brush sizes have been revised, and the identification numbers of the brushes included in the 1938 edition have been altered in consequence. Some extension of scope has been possible, and a range of brushes such as commonly used on traction motors has been added. The specification is a step towards ultimate standardisation, and preferred sizes are given for adoption where possible. Copies can be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1, price 2s. 6d. each.

Canadian Visitors to the "Popular Carriage" Exhibition



Mr. J. T. Whiteford (left) General Passenger Traffic Manager, and Mr. J. B. Thom, European Manager, Canadian National Railways, inspecting a bulkhead of Queen Victoria's coach on the G.W.R. (1874) at the "Popular Carriage" Exhibition at Euston

Notes and News

Assistant to Chief Designer Required.—Applications are invited for the post of assistant to chief designer, aged between 25 and 35 years of age, required by Light-alloys Limited, St. Leonards Road, N.W. 10. See Official Notices on page 308.

Closing of Goods Station.—British Railways, London Midland Region, announce that Ratby Goods Depot, between Desford and Leicester West Bridge, will be closed except for private sidings, on October 4. Alternative arrangements have been made for dealing with merchandise and mineral traffic.

Borough Polytechnic: Course of Lectures on Electric Traction.—A course of 24 lectures on electric traction will be given at the Borough Polytechnic, Borough Road, S.E.1, by specialist lecturers, beginning on Friday, October 1, at 7 p.m. The introductory lecture will be given by Mr. C. M. Cock, of the English Electric Co. Ltd.

Swedish Express Derailed.—An express left the rails at Roervik, between Stockholm and Malmö, on September 6, and plunged into a marsh. Fourteen coaches were derailed, the wreckage of four being strewn along the track. The sleeping cars at the rear remained on the track. Of the 400 passengers in the train, six were killed and 50 injured.

July a Record Month for Tourists.—In July more overseas visitors came to Britain than ever before. The British Travel & Holidays Association has announced that 170,500 tourists arrived during the month, 13 per cent more than in July, 1953, the record to that time. The number of tourists this year so far is well past 500,000, which figure at the end of July 1953 had just been reached.

Xxit (Great Britain) Limited, Products.—Refractory mortars and bonds, fuel additives for marine and industrial uses, solvents and degreasers, and anti-corrosive materials, are among the products of Xxit (Great Britain) Limited, some of them having been exhibited in London last week. The firm has developed an anti-corrosive material, Serviron Damcoat, which remains permanently plastic; the working range is 14–150 deg. F. An anti-corrosive material has been developed called Hydrotimp, with similar qualities, but capable of withstanding temperatures up to 400 deg. F. The Xxit diesel fuel additive is stated to have been used, after tests had been made, for the past five years by the South Shields Corporation in its entire fleet of buses.

John Brown & Co. Ltd. Chairman's Statement.—The Chairman of John Brown & Co., Ltd., Lord Aberconway, says in his 1953-54 statement that order books generally are well filled, but that state cannot continue unless a far greater stability of costs can be foreseen. This applies particularly to export orders, in which field competition becomes increasingly severe. Group capital reserves have been increased from £1,828,000 to £4,575,000 by the excess of the transfer value of the assets taken over by the new wholly-owned subsidiary, John Brown & Co. (Clydebank) Ltd., over their book value and by the excess of the amount so far received for colliery properties over book values at the vesting date. Group trading profits for the year improved from

£2,184,972 to £2,200,661, but investment income, at £121,334, fell by some £35,000. The railway carriage and wagon subsidiary was fully occupied last year and still has substantial orders, but inquiries have fallen off and there is keen competition from foreign firms, some of which can offer relatively long-term credits.

Logging Train Accident in the Philippines.—It is reported that at least 82 persons were killed and 47 injured when a logging train left the rails near Fabrica, in the central Philippines, on September 2. The train was carrying logs from the mountains to a sawmill, and many of the casualties are understood to have been among unauthorised passengers. The load of logs, together with the passengers, was flung into a deep chasm.

Sir Wm. Arrol & Co. Ltd., Dividend.—An interim dividend of 7½ per cent has been declared by Sir Wm. Arrol & Co. Ltd., on the doubled ordinary capital for the year 1954. The dividend will be paid on October 30. It is hoped that a final dividend of 7½ per cent will be justified in due course. A first and final dividend of 20 per cent was paid for 1953 on the capital as it then stood. This, before the 100 per cent free scrip issue, was £296,700.

Shunting by Push Button.—A mechanical method of shunting, largely automatic in operation, has been developed by Mitchell Engineering Limited. Examples are already working at the B.E.A. power station at Leicester and at the central coal preparation plant of the N.C.B. at Dalkeith. Extensive use is made of wagon traversers, hauling mules, and inclined planes, and can be adapted to local circumstances. At Leicester it is possible for a wagon to be taken from the front of a train, weighed full, unloaded, weighed empty, and returned to the rear of the same train without being touched by hand. Two men control the whole of the shunting equipment and can handle 800 tons of coal an hour. Sidings constructed to use this equipment occupy half the usual space and are claimed to reduce operating costs by some 60 per cent.

British Railways Inter-Regional Cricket Championship.—The illustration below shows officers of the British Transport

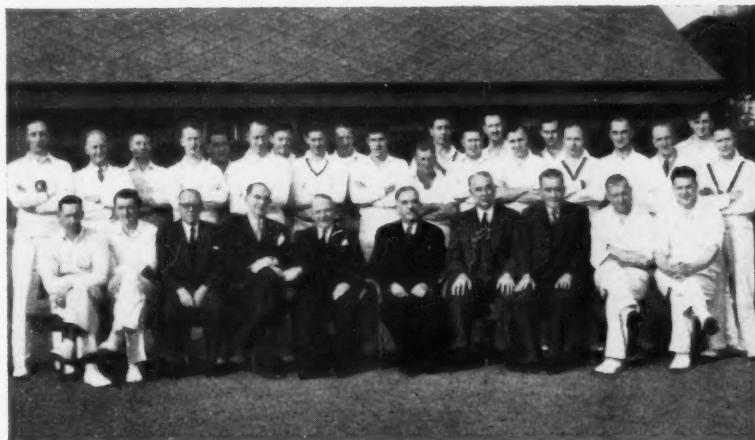
Commission and of the North Eastern and London Midland Regions, with the Regional teams, after the match in which the North Eastern beat the London Midland by 138 runs to 70 in the final of the British Railways Staff Association inter-Regional cricket championship at Raynes Park on August 26 (See our issue of September 3). In the front row are shown (commencing third from left):—

Messrs. C. Cooper, Regional Staff Officer, and H. A. Short, Chief Regional Manager, North Eastern Region; W. P. Allen, Chief of Establishment & Staff, British Transport Commission; Sir Brian Robertson, Chairman, British Transport Commission; Messrs. J. W. Watkins, Chief Regional Manager, and R. Simpson, Regional Staff Officer, London Midland Region.

British Railways, Southern Region, Lecture & Debating Society.—The first meeting for the Jubilee Session of the British Railways, Southern Region, Lecture & Debating Society, will be on Wednesday, October 6, in the Chapter House, St. Thomas' Street, London Bridge, S.E.1, at 5.45 for 6 p.m. The opening address will be given by Sir John Elliot, Chairman of the London Transport Executive, and Mr. C. P. Hopkins, President of the Society, will be in the chair.

London Midland Region Pictorial Posters.—Six new pictorial posters depicting Bedford, Carlisle, Chester, Dublin, Londonderry, and Nottingham, have been produced by the Department of the Public Relations & Publicity Officer, British Railways, London Midland Region, for display at principal stations throughout Great Britain. The original designs are the work of Kerry Lee and represent a completely new technique in the presentation of pictorial maps. The artist has evolved a pattern for a compact arrangement of the principal buildings in the cities and has added small decorative sketches outside the main design to portray other points of interest. The posters will be on display from mid-September to February.

Edgar Allen & Co. Ltd.: Chairman's Speech.—At the annual general meeting of Edgar Allen & Co. Ltd., held in Sheffield on August 12, Mr. W. H. Higginbotham, the Chairman, said that the results for the



Sir Brian Robertson with officers of the British Transport Commission and of the North Eastern and London Midland Regions and the teams after the final of the British Railways Inter-regional cricket championship

year ended April 3 last suffered by comparison with the record year of 1951-52, but in the circumstances results were not unsatisfactory. The trackwork department was very active, and sales of axlebox liners were still expanding and had been extended further into overseas markets. The order books of the company, though lower in some sections than a year ago, were still good, and it seemed that results for 1954-55 might be at least as favourable as in the year under review. The report was adopted.

American Locomotive Company Results.—American Locomotive Company sales for the six months ended June 30 last amounted to \$144,983,087, compared with \$205,709,348 last year. Net income before taxation was \$5,036,099 (\$10,193,574). Provision for income and excess profits taxes was \$2,515,000 (\$7,045,000) and net income after taxation \$2,521,099 (\$3,148,574). The common dividend took \$885,788 (\$889,538), representing \$1.04 per unit \$1.38. The net working capital stood at \$49,490,726 (\$46,298,163).

Institution of Locomotive Engineers.—Mr. A. Campbell will deliver his Presidential Address to the Institution of Locomotive Engineers, on Wednesday, September 22, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Before the delivery of the Address the awards for Papers read during the 1953-54 Session will be presented by Mr. R. C. Bond, the Retiring President.

British Railways Window Display.—The window display at British Railways Travel Centre, Lower Regent Street, London, shown in the accompanying illustration, features North-East England and Scotland, and exhibited for eight weeks, was designed by the Public Relations & Publicity Department of the North Eastern Region. The central figure of an owl linked the "Be Wise" exhortation to the display. The four oval photographs were in full colour, as were the two central views of Loch Katrine and a Yorkshire Dale. Use

was made of figured wirework for the literature holders and for the keying motifs. A feature of the owl was that its eyes were continually moving; this movement was obtained by a simple arrangement of solenoid and magnet.

The Romney, Hythe & Dymchurch (Light Railway).—Capt. J. E. P. Howey, Chairman of the Romney, Hythe & Dymchurch (Light) Railway, is reported to be considering plans for an extension of the line to Ferryfields Airport, a cross-Channel car ferry terminal. The route has been surveyed and found to be satisfactory.

Pneumatic Bar Feed for Automatics—Automation Limited.—of Vicarage Crescent, London, S.W.11, is manufacturing under licence the Lipe automatic magazine, bar feed, for single automatics, applicable to Brown & Sharpe, B.S.A. Index, and so on. The unit is actuated by a pneumatic control system of valves and cylinders. In the first operation the lower half of the feed tube is moved backward to receive the bottom piece of bar held in the magazine, secondly, the lower half of the feed tube with bar, is returned, and the pusher begins to function. The unit rejects the bar end automatically without the attention of the operator. The magazine can be loaded with stock bars ranging from 19 of $\frac{1}{8}$ in. dia. to 96 of $\frac{1}{2}$ in. dia. Feed cylinder air pressure is from ten to 25 p.s.i. Full details are given in an illustrated leaflet issued by the firm.

Norwegian Railway Centenary.—A railway exhibition was opened in Oslo on September 1, as part of the celebration of the opening of the first railway in Norway referred to in last week's issue. King Haakon and Crown Prince Olav went to it in the centenary train, run from in front of the town hall to the exhibition grounds. Britain was represented at the celebrations by Sir Reginald Wilson, Member of the Transport Commission. The driver of the first train from Oslo to Eidsvoll on September 1, 1854, is said to have been William Graham, born at Darlington in

1821. His son, William Graham, is today a pensioned engine driver, his grandson, Rolf, is a driver, and his great-grandson, John, is an employee of the Norwegian State Railways. Rolf Graham drove the centenary train last Saturday.

British Railways, Western Region, London Lecture & Debating Society.—The programme for the forthcoming session of the British Railways, Western Region, London Lecture & Debating Society, which commences on Thursday, October 7, and marks the Golden Jubilee of the Society, includes addresses by the Minister of Housing & Local Government, and the Chief Regional Manager, Eastern Region, papers on the railway medical service, the activities of the Stock Exchange, and Messrs. Unilever, respectively, in relation to transport, railway safety, commercial development, debates with other kindred societies, and a Prize Essay reading. The meetings are held in the Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, commencing at 5.45 p.m.

Preperite Rust Remover.—A general purpose material known as Preperite No. 1 for the removal of rust and corrosion, has been evolved by the Pyrene Co. Ltd. Metal Finishing Division. For application by brush Preperite chemical No. 1 should be diluted with water in a proportion of 2 to 1 and allowed to remain in contact for five minutes. For application by immersion, Preperite No. 1 solution is diluted in a proportion of 1 to 2 with either hot or cold water; the tank should be lead or rubber lined, of stainless steel or glazed earthenware. The period of immersion varies depending on whether the solution is heated or used cold. In the case of the application of the material to structural steel work in situ, the solution should be allowed to dry for a minimum of 24 hours. Details are given in a leaflet issued by the firm.

Charles Roberts & Co. Ltd. Results.—The accounts of Charles Roberts & Co. Ltd. and subsidiaries for the year ended March 31 last show the group gross earnings as £233,079, compared with £236,591 in the previous year. Interest due amounted to £1,414 (£1,531) and depreciation to £30,322 (£31,407). Emoluments, fees, and pensions took £34,136 (£34,164). Sundry interest and dividends amounted to £79,872 (£79,822), and interest on tax reserve certificates £1,643 (£2,030). Taxation took £234,675 (£209,962). The net profit amounted to £83,675 (£111,584), to which was added £308,069 (£271,903) brought forward from last year, which, together with £3,002 surplus on realisation of an investment and £16,786 transferred from E.P.T. postwar refund suspense account, left £411,532 (£383,487) available for appropriation. Dividends took £80,839 (£75,418), leaving £330,693 (£308,069) to be carried forward.

College of Production Technology.—The College of Production Technology is extending its residential courses at Swinford Old Manor, near Ashford, Kent, and at its new premises in Charing, Kent. There are five-day courses in materials handling, work study, and method study. Courses lasting two weeks are provided in materials handling, work study, and in the two subjects combined. There are also six-week courses in these subjects. Fees for five-day courses are £29, and for two-week courses £48. The six-week course is the only one of its kind held in Great Britain and application has been already received



Window display at British Railways Travel Centre, Lower Regent Street, London, featuring North-Eastern England and Scotland

from Australia, France, Germany, Norway, India, Portugal, Israel, and the U.S.A. Full particulars of the courses are available from the Secretary of the college at the first address given above.

Goods Train Derailed.—A 41-wagon goods train, which was travelling from Brighouse, Yorkshire, to Niddrie, Edinburgh, ran off the line near Warkworth, Northumberland, on September 7. The track was blocked by the wreckage of 35 of the wagons. The only person injured was the guard of the train, who received slight injuries for which he received first aid. The guard's van was telescoped.

The Brush Group in Venezuela.—The Brush Group Limited will in future trade in Venezuela under the title Brush Group de Venezuela Sociedad Anonima, which will be responsible for the sale of products from the following group factories: Brush Electrical Engineering Co. Ltd., Loughborough and Cardiff; Petters, Limited, Staines; J. & H. McLaren, Limited, Leeds (including Petter-McLaren and Petter-Fielding engines); the National Gas & Oil Engine Co. Ltd., Ashton-under-Lyne; and Mirrlees, Bickerton & Day Ltd., Stockport. The new company will also represent Enfield Cables Limited in Venezuela. Mr. C. P. Court, formerly on the staff of the group's agents, Compania Anonima Motoria, has been appointed Director & Manager.

Transport in East London.—The Essex Councils of Wanstead and Woodford, Leyton, and Chigwell, have submitted a plan for improved public transport in eastern London to the committee of inquiry into London Transport under the chairmanship of Mr. S. P. Chambers. The councils are asking for a new steam service from East Ham, steam trains from Broad Street to Epping during the day, and electrification of the line from Liverpool Street to Chingford. Other points are that tube trains should have at least eight coaches at peak hours and should run at two-minute intervals; fares on the Liverpool Street to Chingford line should be cheaper to draw traffic from the over-crowded Central Line, early morning tickets should be extended, and local councils should be directly represented on the London Transport Executive.

Crompton Parkinson Tong Test Ammeters.—Crompton Parkinson Limited has modified its Tong Test ammeters to include hardened and polished carbon steel pivots working in spring-mounted jewel bearings, a feature which provides a high degree of accuracy. It is stated that with the company's method of individually calibrating the dial of each instrument before it leaves the works, an accuracy of plus or minus 1 per cent is ensured for both A and B types, used for encircling cables up to 1½ in. dia. Users desiring one of the interchangeable dial units after the tongs have been purchased, should return them to the works so that extra dial units can be individually calibrated to the instrument. To avoid delay with overseas users the company will supply extra dial units without individually calibrating them.

Silentbloc Limited.—The group trading profit for the year to May 31 last amounted to £244,772 (against £211,649 for the previous year). After charging depreciation, and so on, and providing £103,771 (£103,946) for taxation, the net profit was £69,252 (£60,051). The dividend for the year is unchanged at 20

per cent. A transfer to asset replacement reserves of £25,044 (£20,000) is made. The balance carried forward is £49,502. Consolidated net current assets are slightly higher on the year at £387,000. Commitments outstanding at year end for capital expenditure, not provided for in the present accounts, amount to £212,000. Of this sum, it is stated, £160,000 relates to the new factory now in course of erection, and in this connection arrangements have been made for the issue of further debentures amounting to £130,000.

European Rail Freights.—An agreement is reported between representatives of the six member nations of the European Coal & Steel Pool on a standard "taper" in freight rates in relation to distance. Agreement is implied on the "harmonisation" of rates, which has hitherto been used as a discriminatory instrument between nations. The effect of the agreement will be to enable through freight rates to be quoted on a more or less uniform system, even although the journey may cross several boundaries between member-nations. In the past, freight crossing a frontier became, in effect, a new haul, and the amount of taper depended on the distance travelled within each country rather than on the total length of the haul. The agreement will apply to coal, steel, iron ore, and scrap, but has to be ratified by the Governments concerned.

Wagon Repairs Limited.—Fixed assets of Wagon Repairs Limited were entered in the consolidated balance sheet on March 31 last at £1,001,253. This compares with £937,543 for the previous year. Current assets were £2,338,287 (£2,190,201), of which £953,932 represented stock-in-trade and work in progress, £819,412 debtors,

and £329,829 cash. Paid-up capital and reserves totalled £1,889,484 (£1,779,197). Deferred liabilities were £891,179 (£844,461), and current liabilities and provisions £558,877 (£504,086). Financial results for the year were given briefly in our issue of 23 July.

Sales Transport Units.—The British Transport Commission has now issued a further list of transport units for sale. The list, No. R.4, contains units drawn from all divisions, including the special traffics division. A proportion of the units are offered with premises, and the majority are small, the largest unit offered containing 40 vehicles with an unladen weight of 162 tons. Tenders for units in this list must be received by the B.T.C. by 10 a.m. on October 13, or if land and buildings are included, by 10 a.m. on October 27. The units in this list have been offered previously.

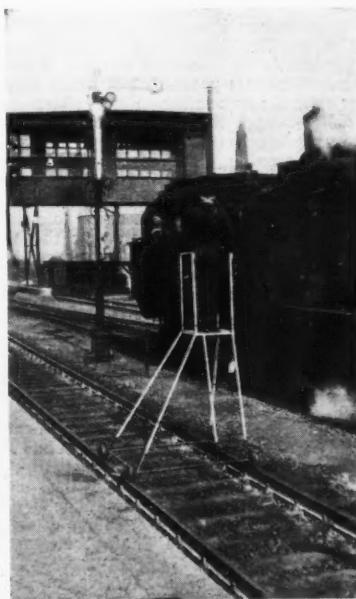
B.S.A. Exhibits at Milan.—The exhibits of B.S.A. Tools Limited at the forthcoming European Machine Tool Exhibition at Milan will include a comprehensive selection of single-spindle automatic screwing machines, a No. 8 centreless grinder, a 6 in. x 28 in. hydraulically-operated copy turning lathe, and an Acme-Gridley 5½ in. six-spindle chucking machine. Two new machines will also be displayed, which will include a form generator, based on the Pee-Wee No. 3 thread rolling machine, capable of rolling deep forms such as acme threads, worms, and gears, together with a B.S.A. Metric 18L single-spindle automatic, screw machine, a feature of which is an open front and accessibility.

Owen Falls Contractors' Plant.—The Owen Falls Construction Company, of Jinja, Uganda, have appointed George Cohen Sons & Co. Ltd., of London, as selling agents for the disposal of the large quantity of civil engineering plant used for the construction of the Owen Falls hydroelectric scheme. Among the items to be sold are: excavators, tractors, dumper trucks, dump tracks, derricks, steam cranes, diesel locomotives, air compressors, pumps, hoists and lifting tackle of all kinds; also a number of complete plants for batching and mixing concrete, sand washing, crushing and screening, and so on. All the plant is of modern design and has been carefully maintained.

Wickman Limited Chairman's Statement.—In his statement circulated with the report and accounts of Wickman Limited for the year ended March 31 last, Sir Stanley Rawson, the Chairman, comments that the completion of the rearmament programme resulted in lower levels of trading in machine tools. The lower level of taxation, however, resulted in the net profit differing little from the previous year. The order book is substantial, and although incoming orders are fewer there appears to be increasing interest in Great Britain in high productivity machines. Group trading profits, with certain additions, amounted to £1,045,422 compared with £1,179,235 for the previous year. Net profit was £290,291 (£293,671). The dividend for the year, already announced, is 15 per cent, free of tax.

London Transport Officers Tour of North America.—Mr. L. C. Hawkins, Member, and Mr. J. B. Burnell, Operating Manager (Central Road Services), London Transport Executive, have left this country on a

Testing the Sighting Distances of Signals



Light movable framework enabling the sighting of signals to be checked from footplate level, in use by the German Federal Railway (see editorial note in our December 25, 1953 issue)

six-week visit to the U.S. and Canada, where they will visit road transport undertakings. One of their special interests will be the measures to combat street congestion adopted by city administrations, including New York, Toronto, Washington, Philadelphia, Chicago and San Francisco.

Electrification in the U.S.S.R.—The official organ of the Russian Railways' Union has pointed out that this year marks the 25th anniversary of the first railway electrification in the U.S.S.R. Plans for further electrification, it is stated, include part of the Trans-Siberian as far east as Irkutsk, other lines connecting Russia in Europe with industrial regions east of the Urals, the Moscow-Leningrad main line, and suburban lines in industrial areas.

George Cohen Sons & Co. Ltd. Results.—The total group turnover of George Cohen Sons & Co. Ltd., for the year ended March 31 last, amounted to some £17,818,000, compared with £21,615,000 in the previous year. Net earnings before taxation were £1,214,536 (£1,764,760). Taxes and E.P.L. took £873,954 (£1,296,156). Net profits after taxation were thus £340,582 (£468,604). Mr. C. M. Cohen, Chairman & Managing Director, says in his statement that the time is rapidly approaching when new finance of a medium or long term character should be introduced. An announcement will be made as soon as possible. Signs for the current year are encouraging and orders are coming in briskly. The dividend for the year is maintained at 12 per cent.

Tempomat Control Units.—Philips Electrical Limited has evolved a range of electronic control equipment for resistance welding applications. This equipment, known as the Tempomat Series P.E.5.000, is available in four cabinet sizes, depending on the complexity of the welding programme cycle to be controlled. Combinations of a range of units, within six standard panels, permit the building up of at least 180 different arrangements of welding sequence to cover every possible welding requirement. The most simple arrangement of units, comprising an ignitron contactor unit and synchronous thyatron firing unit, is contained in the P.E. 5010 cabinet. If required a simple non-synchronous timer and heat control can also be incorporated, if these are not already available in the welding machine.

Railway Stock Market

Much business has again been transacted in stock markets, where daily recorded dealings reached their highest level for nearly eight years. New record prices have been touched by many leading industrial shares after a moderate reaction earlier in the week when sentiment came under the influence of the Formosa news and other developments in international affairs. Subsequently, the new Stock Exchange account was followed by another wave of buying. Despite the further gains there is still little profit-taking, but buyers naturally tend to favour securities which have not participated strongly in the advance. Forthcoming new issues are likely to absorb a large volume of investment money, but the prevailing belief is that the upward trend will continue.

Among foreign rails better demand developed for Antofagasta ordinary stock, which strengthened to 8½, and the preference stock has been firm at 42½.

There was a little speculative buying of Dorada Railway ordinary stock around 80½ on the assumption that there may be future take-over possibilities. Guayaquil & Quito 5 per cent bonds changed hands up to 60, while business at 155 was marked in International of Central America 5 per cent gold bonds.

Chilian Northern 5 per cent debentures were dealt in at 29½ and Paraguay Central 6 per cent debentures at 20. Costa Rica ordinary stock was 11 and the 6½ per cent second debentures changed hands at 53. Taltal Railway shares transferred up to 13s. 3d. and Nitrate Rails shares were quoted at 19s. 9d. San Paulo ordinary units were 3s. 6d. United of Havana second income stock was 35½ and the consolidated stock 5.

Canadian Pacifics have been steady at 546½ with the 4 per cent preference stock £68½ and the 4 per cent debentures £92½, but there was further selling of White Pass no par value shares which receded afresh to \$30. Algoma Central & Hudson Bay 5 per cent first debentures marked £251. Among other overseas rails, Emu Bay 5 per cent debentures marked 43, Midland of Western Australia 25 and the 4 per cent second debentures around 42½.

There was less business in Nyasaland Railways shares, which were dealt in around 5s. 6d. Among Indian stocks, Barsi transferred down to 96 and West of India Portuguese at 91.

Engineering and kindred shares have been more active and generally higher, though gains on balance were mostly moderate. It is expected in the City that the next offer of de-nationalised steel shares will be announced shortly, and the general belief is that it is likely to be by John Summers. Like other steel shares, they are expected to be issued at a price showing a yield of over 7 per cent. In view of the big rise in stock market prices in recent months, a 7 per cent yield is of course much more attractive than earlier in the year.

Steel shares generally can be regarded as moderately priced and certainly have their merits for investors wanting a good yield. There is probably not much scope for capital appreciation in steel shares yet awhile, though they would no doubt rise strongly later on if the result of the next general election dispelled the fear of re-nationalisation. Moreover, it is argued in the City that, even in the event of re-nationalisation, the compensation to shareholders could hardly be less than the low prices at which steel shares are now being offered back to investors.

Vickers attracted profit-taking after their recent big rise, and were 38s. 7½d. "ex right" to the new shares which were 12s. 4½d. premium over the 27s. 6d. issue price. Guest Keen have been firm at 64s. in response to market talk of higher dividend possibilities, while there were buyers around 72s. 6d. for Tube Investments. T. W. Ward rose to 53s. George Cohen 5s. shares at 11s. 4½d. were unaffected by the chairman's annual review and the news that the raising of more capital is under consideration. Ruston & Hornsby were 53s. 3d.; but elsewhere Thornycroft eased to 43s. 9d.

Among shares of locomotive builders and engineers, Beyer Peacock have been firm at 46s. 4½d. with Charles Roberts 5s. shares 9s. 3d. Birmingham Carriage were higher at 26s. 10½d.. Hurst Nelson 42s. and North British Locomotive 15s. 9d. Vulcan Foundry were 30s., Gloucester Wagon 10s. shares 20s. 9d. and Wagon Repairs 5s. shares 13s. 6d.

Forthcoming Meetings

September 10 (Fri.)—Locomotive Society of Scotland, at 302, Buchanan Street, Glasgow, C.2, at 7.15 for 7.30 p.m. Paper entitled "G.W.R. Reminiscences," by Mr. John Drayton.

September 17 (Fri.) to September 20 (Mon.)—The Bonar Law Memorial College, Berkhamsted, Herts, in conjunction with the Institute of Transport: Weekend course on "Transport" at Ashridge.

September 17 (Fri.)—Institute of Traffic Administration, Merseyside Centre, at the Stork Hotel, Queens Square, Liverpool, at 7.45 p.m. Paper on "Transport of Foods by Rail" by Mr. C. H. Keen.

September 18 (Sat.)—British Railways, Southern Region, Lecture & Debating Society. Visit to the R.E. Transportation Centre at Longmoor.

September 18 (Sat.)—Permanent Way Institution, London Section: Visit to Longmoor Military Railway, Hants.

September 22 (Wed.)—Locomotive Society of Scotland, at 302, Buchanan Street, Glasgow, C.2, at 7.15 for 7.30 p.m. Paper on "The Locomotive Trials in Relation to British Standard Locomotives," by Mr. Alfred Oliver.

September 22 (Wed.)—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Presidential address by Mr. A. Campbell.

September 22 (Wed.)—East Indian Railway Officers' Association Annual Dinner at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, at 6.30 for 7 p.m.

Until September 25 (Sat.)—"Popular Carriage" Exhibition (Two centuries of carriage design for road and rail) in the Shareholders' Meeting Room, Euston Station, London, N.W.1. Weekdays 10 a.m. to 7 p.m.; Sundays 2 to 7 p.m.

OFFICIAL NOTICES

The engagement of persons answering situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

COMPETENT Site Agents and Foremen required, must be fully conversant with Railroad construction. Good pay and prospects for the right men. Apply: The Eggle Construction Co. Ltd., Scunthorpe, Lincs.

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INTERNATIONAL RAILWAY ASSOCIATIONS. Notes on the work of the various associations concerned with International traffic, principally on the European Continent. 2s. By post 2s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

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